SERVICE DATA
FILE NO. 170-079

TOSHIBA

DIGITAL SYNTHESIZER STEREO TUNER

ST-530

SPECIFICATIONS

■ General Data

Power Supply:	220V – 50 Hz for Europe 240V – 50 Hz for United Kingdom & Australia
Power Consumption:	14W
System Dimensions (mm):	420(W) x 96(H) x 320(D)
System Weight:	5.0 kg

■ Tuner

Micro computer controlled frequency synthesizer tuning

Frequency Range:	FM 87.5 – 108.5 MHz 422 channel LW 146 – 281 kHz 136 channel MW 522 – 1611 kHz 1090 channel SW 5.9 – 6.3 MHz 81 channel
Memory:	8 channels each band (FM/SW/MW/LW)
Functions:	Auto tuning (FM 100 kHz, MW 9 kHz step) Manual scanning FM +50 kHz shifting reception

* FM Tuner Section

Sensitivity (IHF):	1.9μV (10.8 dBf)
Harmonic Distortion:	1 kHz MONO 0.15% STEREO 0.25%
S/N:	MONO 72 dB STEREO 68 dB
Frequency Response:	30 – 15 kHz ±1.0 dB
Selectivity (IHF):	75 dB (±400 kHz)
Image Rejection:	70 dB
IF Rejection:	90 dB
Capture Ratio:	1.0 dB
Spurious Response:	90 dB
AM Suppression:	55 dB
Stereo Separation:	45 dB (at 1 kHz)

* MW Tuner Section

Receiving Frequency:	522 – 1611 kHz (1 kHz step)
Sensitivity:	300μV/m
Selectivity:	30 dB
Image Rejection:	40 dB
S/N:	50 dB

* LW Tuner Section

Receiving Frequency:	146 – 281 kHz (1 kHz step)
Sensitivity:	250 μV/m
Image Rejection:	50 dB
S/N:	45 dB

* SW Tuner Section

Receiving Frequency:	5.9 – 6.3 MHz (5 kHz step)
Sensitivity:	30 μV/m
Image Rejection:	25 dB
S/N:	40 dB

Specifications are subject to change without notice.

TE, TU

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1. OPERATING CONTROLS

FRONT VIEW

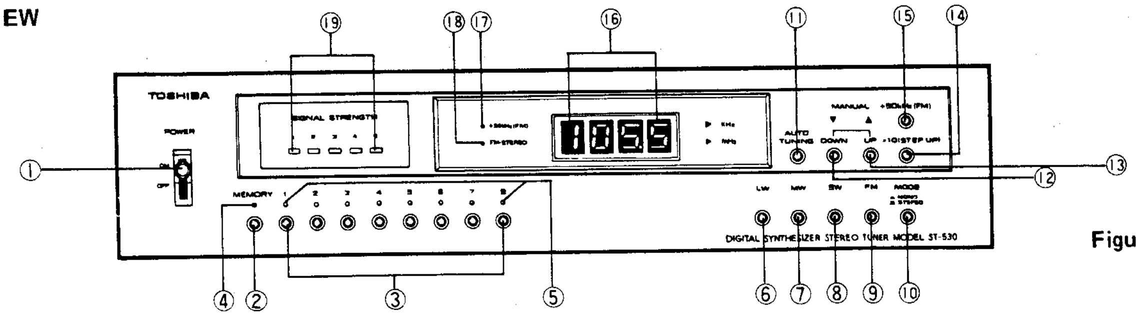


Figure 1.

- **power switch** ①
  When the power switch is turned on, a frequency will be shown immediately in the display. This frequency will be the same as the last tuned station before power was turned off.

- **radio band selector buttons**
  Choose your program source by pressing one of these function buttons:

⑥–	lw:	for LW radio broadcasts
⑦–	mw:	for MW radio broadcasts
⑧–	sw:	for SW radio broadcasts
⑨–	fm:	for FM radio broadcasts

- **memory push-button** ②
  To store the frequency of any desired station in the memory, first press this button. The memory indicator lamp ④ directly above this button lights up to indicate that the memory is ready to accept the frequency, but note that this is a rather short period (approx 5 seconds).

- **preset tuning buttons** (1 – 8) ③
  Once the memory button ② has been pressed, press one these buttons immediately afterward to store the frequency of the desired station in the memory. To recall the frequency at a later date, simply press the corresponding tuning button.

- **mode** (mono/stereo) ⑩
  Excessive noise in an FM stereo broadcast may be reduced by switching over to "mono". Otherwise leave in the "stereo" position.

RADIO TUNING

- **auto tuning** ⑪
  For tuning in the FM and MW bands, press this button to "scan" the frequencies automatically. The scanning motion will stop once a broadcast station is tuned.

- **manual down** ⑫
  The frequency is changed (reduced) one step at a time every time this button is pressed. If the button remains depressed, the frequency will change continuously until the button is released again.

- **manual up** ⑬
  The frequency is likewise increased stepwise by this manual up button, the change being continuous if the button remains depressed.

- **x10 push-button** ⑭
  By pressing this button, and then either the manual up ⑬ or manual down ⑫ button immediately afterward, the tuned frequency may be changed at the 10.digit rather than at the unit digit, thereby speeding up the tuning process, particularly in the MW band.

- **+50 kHz push-button** ⑮
  FM .frequencies may be "fine-tuned" by pressing this button. +50 kHz is added to the displayed frequency.

INDICATORS

- **digital frequency** ⑯
  The tuned frequency in all 4 bands (LW/MW/SW/FM) is displayed here in digital form.

- **+50 kHz indicator lamp** ⑰
  Lights up when the +50 kHz button is pressed to shift the tuned FM frequency by +50 kHz (fine tuning).

- **fm stereo indicator lamp** ⑱
  Lights up when an FM stereo station has been tuned.

- **memory indicator lamp** ④
  This LED lamp lights up for approx 5 seconds only when the memory button ② is pressed. Presetting of the desired station must be performed before this lamp goes out.

- **preset indicator lamps** (1 – 8) ⑤
  When setting a station into the memory, and when selecting that station at a later date, the LED indicator lamp corresponding to the pressed preset tuning button ③ will light up.

- **signal level** ⑲
  These LED lamps light up from left to right, the stronger stations being indicated by more lamps. If 4 or 5 lamps fail to come on for a local station, check Aerial connections and direction.

ess the desired radio band selector button.

tomatic Tuning

For FM or MW radio stations, press the auto tuning button ⑪ The displayed frequency will shift automatically, and stop when the frequency of the next station is tuned.

e 1. If the next station is a rather weak (remote) station, the frequency display will not stop, but proceed to the next sufficiently strong station. Weaker stations must be tuned manually (see below).

te 2. Automatic tuning does not operate in the LW or SW bands.

To proceed to another station, simply press the auto tuning button ⑪ again.

nual Tuning

Press the manual down ⑫ or manual up ⑬ button, and keep it depressed to shift the displayed frequency toward the desired station frequency. When close to the desired frequency, release the button, and then press again in single steps to tune into the frequency.

When the x10 button ⑭ is pressed with the manual down or manual up button, the displayed frequency will shift in steps of tens rather than units (i.e. shift speed increased by 10). This is particularly useful in speeding up tuning operations in the MW band.

Note that the x10 push-button is reset automatically when the manual up or down button is released. In order to continue in x10 tuning mode, it is necessary to press the x10 push-button again before using the manual up or down button.

Reset Tuning

The major feature of the ST-530 is the digital synthesizer tuner section and the capacity to memorize 8 separate stations in each of the 4 bands (i.e. a total of 32 stations). Once a station is preset in the memory, it may be tuned accurately and immediately whenever desired by a single push-button operation.

(1) First check the official broadcasting frequencies of the desired stations (up to 8 stations in each band), or else simply tune directly to the stations as described above by automatic or manual tuning.

(2) After confirming that the station is accurately tuned, press the memory push-button②. The memory indicator lamp④above it will light up (for approximately 5 seconds) to indicate that the memory is ready to store the frequency.

(3) Immediately press one of the preset tuning buttons③while the memory indicator lamp is still on. If it goes out before the desired preset tuning button can be pressed, simply press the memory button again.

(4) Repeat the above process for all other stations to be stored in the memory (maximum of 8 stations per band).

(5) Any of these preset stations may then be tuned in again at any later date by simply pressing the relevant memory button (with desired radio band selector button switched on).

Note 1. If there is a prolonged power failure of more than one day, memory contents will be lost. In this case the preset tuning operations will have to be repeated.

Note 2. In strong signal areas, MW auto-tuning may result in slight detuning (by 9 kHz). In such cases, use manual tuning.

REAR VIEW

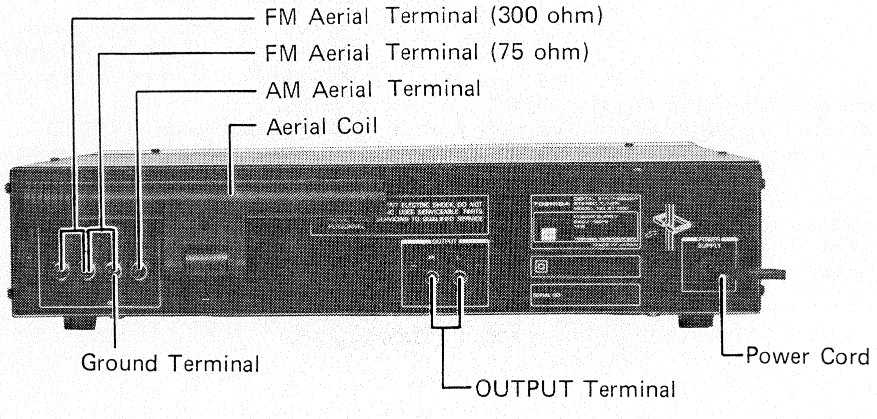
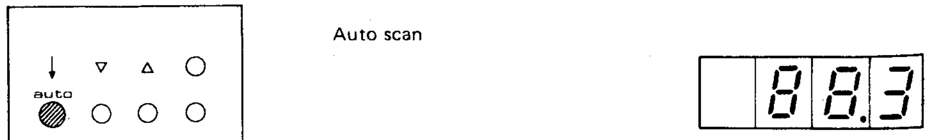


Figure 2.

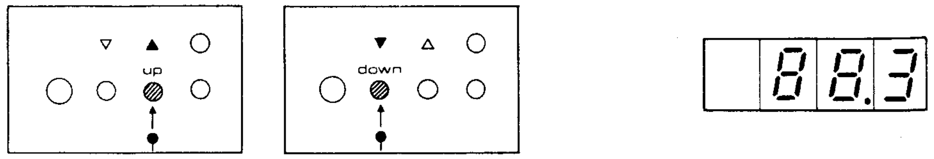
2. PUSH BUTTON OPERATIONS

1 Automatic tuning

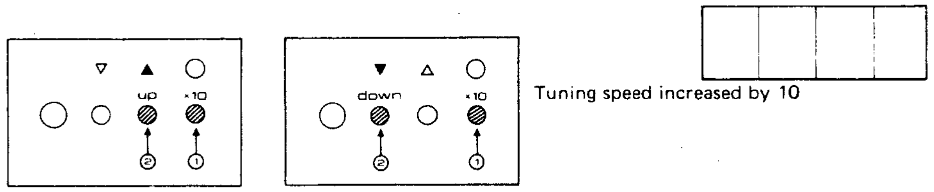

auto
Auto scan
88.3

(FM 88.3 MHz)

2 Manual tuning

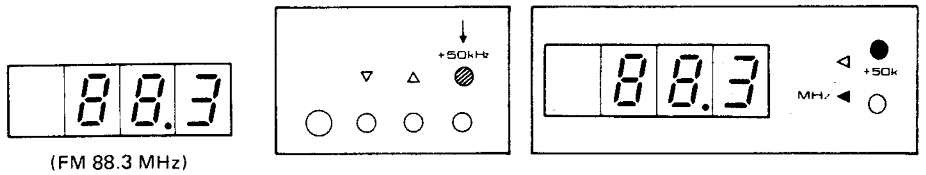


3 Fast tuning (x10 speed)


up
×10
down
×10
①
②

Tuning speed increased by 10

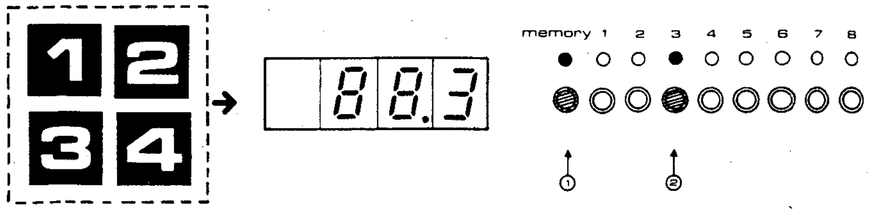
4 Fine tuning


88.3
+50kHz
88.3
+50k
MHz

(FM 88.3 MHz)

(FM 88.35 MHz)

5 Preset tuning


1 2 3 4
88.3
memory 1 2 3 4 5 6 7 8
①
②

Tuning

Memory → 3ch. (FM 88.3 MHz)

3. TECHNICAL POINTS

ST-530 Synthesizer System

* A description of the basic operational principles for the Frequency Synthesizer System employed in the ST-530.

[1] Introduction

The following major ICs are employed in the basic circuit of the Frequency Synthesizer Tuning system.

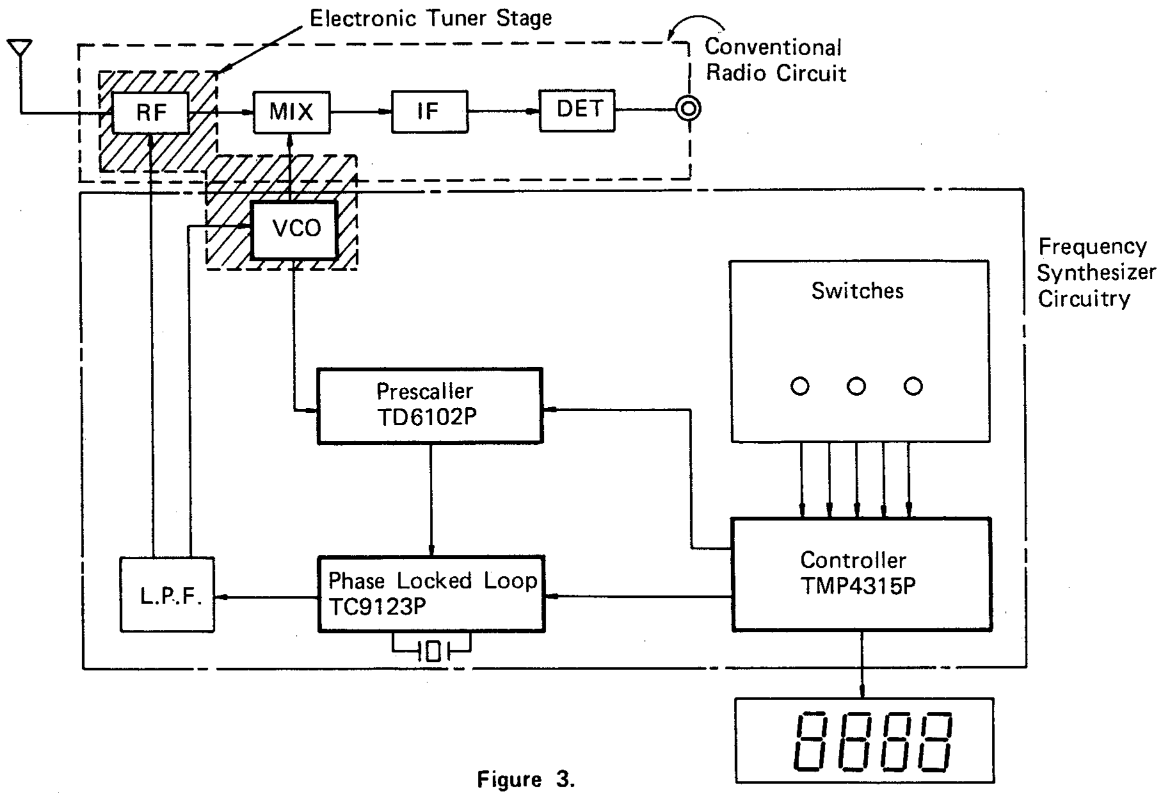

Electronic Tuner Stage
Conventional Radio Circuit
RF
MIX
IF
DET
VCO
Frequency Synthesizer Circuitry
Switches
Prescaller TD6102P
L.P.F.
Phase Locked Loop TC9123P
Controller TMP4315P
8888

Figure 3.

This circuit is described in detail in the SM-4750 Service Text which should be available for reference purposes. Note that this description covers only those parts not included in the SM-4750 Service Text.

[2] Frequency Display Mode

The TMP-4315P controller is an LSI developed specifically for clock-equipped FM/MW/SW/LW frequency synthesizer tuners.

Since the major display mode of this LSI is "time display", it is necessary to make a conversion to "frequency display". The circuit operation is described below (see Figs. 4 and 5).

(1) When the power is first switched on, V_{DD} is established immediately on pin ㊷ of IC207.
(2) The voltage applied to pin ㉓ is delayed by the R224/C218 time constant.
(3) During this period, all outputs become "H" level, resulting in the voltage at $OT3_1$ ⑲ changing as shown in Fig. 5.
(4) The pin ⑲ output is applied to IC213 where a slightly delayed signal is obtained from the 2 AND GATE circuits and appears at output pin ⑩ of IC213.
(5) This output signal is passed through IC210 where its polarity is inverted prior to being returned to one of the gates in IC213.
(6) The timing signals being issued from pin ㉙ of IC207 are applied to one of the gates in IC213 resulting in an AND output.

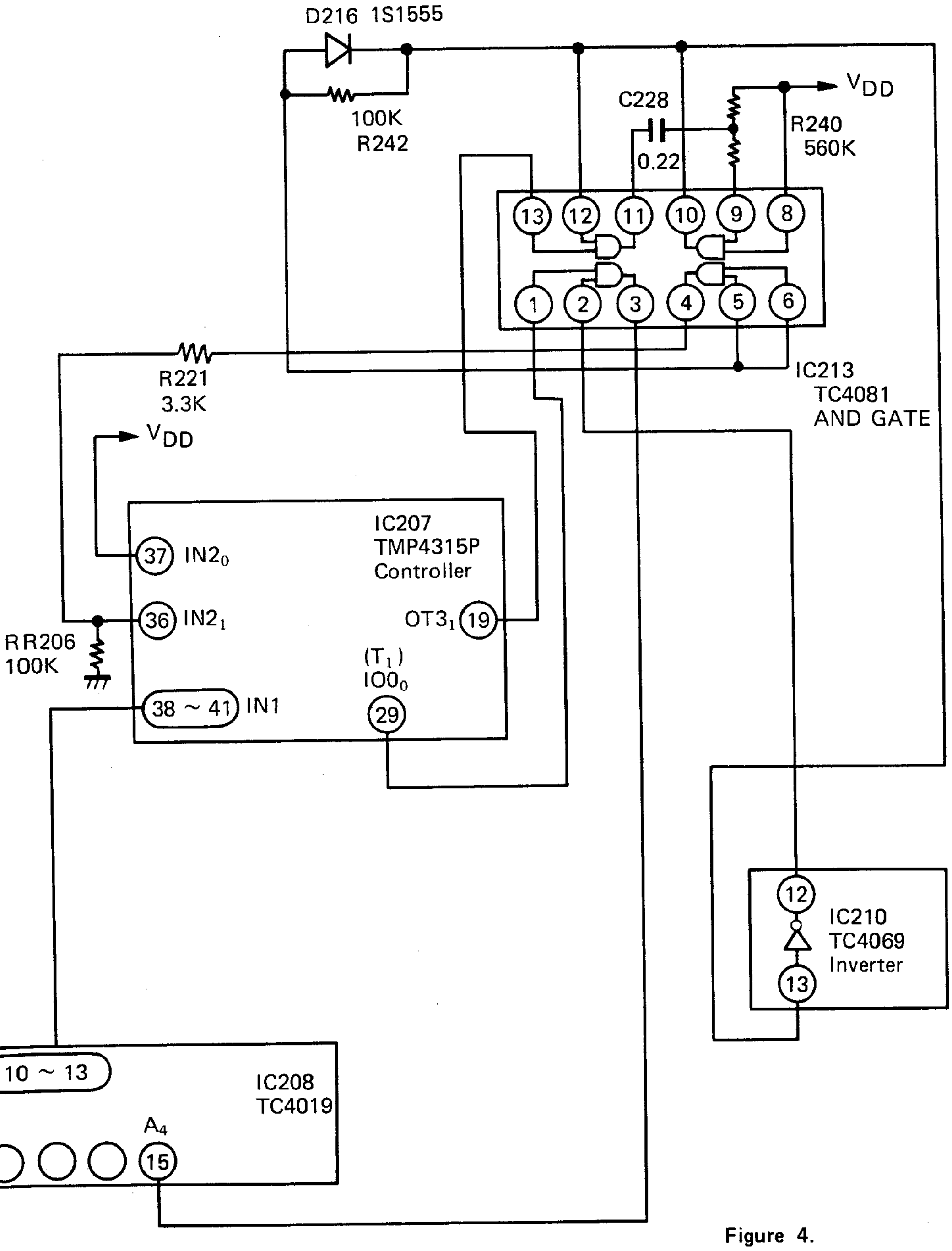

D216 1S1555
100K
R242
C228
0.22
R240
560K
VDD
13
12
11
10
9
8
1
2
3
4
5
6
IC213
TC4081
AND GATE
R221
3.3K
VDD
IC207
TMP4315P
Controller
37 IN2₀
36 IN2₁
OT3₁ 19
(T₁)
IO0₀
29
RR206
100K
38 ~ 41 IN1
12
IC210
TC4069
Inverter
13
10 ~ 13
IC208
TC4019
A₄
15

Figure 4.

(7) The output from pin ③ of IC213 is applied to pin ⑮ of IC208. When this input pin detects switching operation data, the data is applied to pin ⑮ A4, the output signal appearing at pin ⑬. This output is then applied to pin (38) of IC207, thereby activating the start of the basic controller "time display" mode with the time about to be displayed in the D101 and D102 LEDs.

(8) However, the rising pulse on pin ⑩ of IC213 is passed via R242 (100K), C229 (0.047) and R221 (3.3K) to pin (36) of IC207, resulting in this terminal being switched to "H" level. In this case, the controller operates in the following way.

(9) Time display changes to frequency display for 5 seconds, and then changes automatically to the display mode determined by pin (37).

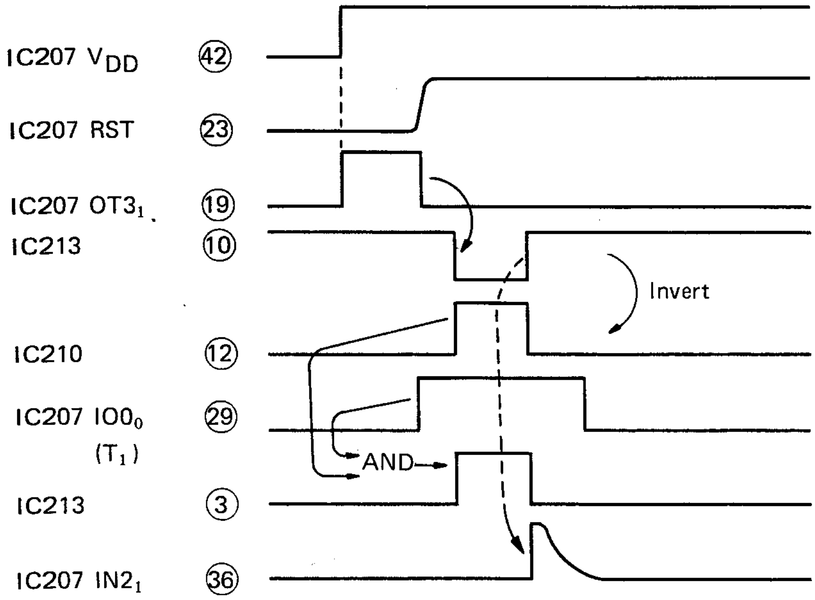

IC207 V_{DD} ㊷
IC207 RST ㉓
IC207 $OT3_1$ ⑲
IC213 ⑩
Invert
IC210 ⑫
IC207 IOO_0 (T_1) ㉙
AND
IC213 ③
IC207 $IN2_1$ ㊱

Figure 5.

(10) Pin ㊲ mode settings include:—
"H" level .... frequency display
"L" level .... time display
In the ST-530, this pin is H level (V_{DD}) connected, so the frequency display is maintained without any further change.
Although 0000 is displayed the instant the switch is turned on, this is due to the short delay in the application of the "H" level to pin ㊱ of IC207, and does not indicate a failure.

[3] Initialization

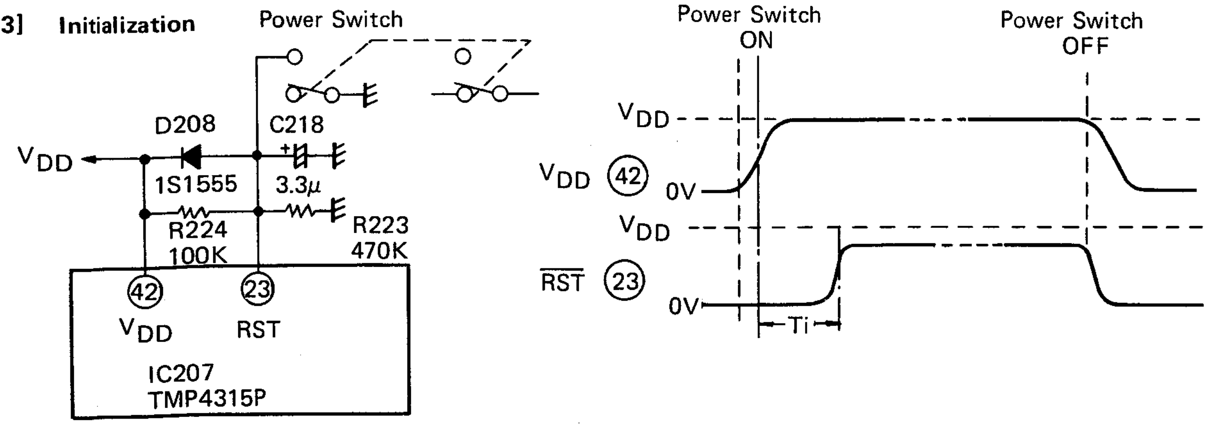

Power Switch
D208
C218
V_{DD}
1S1555
3.3μ
R224
100K
R223
470K
㊷
㉓
V_{DD}
RST
IC207
TMP4315P
Power Switch
ON
Power Switch
OFF
V_{DD}
V_{DD} ㊷
0V
V_{DD}
$\overline{RST}$ ㉓
0V
Ti

Figure 6.

- * To initialize the IC207 LSI, it is essential that the voltages applied to pins ㊷ and ㉓ rise according to the timing shown in Fig. 6 above.
- * If this timing is disrupted and pin ㉓ voltage becomes positive, digits displayed will become completely meaningless and further operation will become impossible. If, however, voltage is again applied according to the above time relation, normal operation will be restored.
- * If the power switch is turned on, off, and then on again within about 1 second, the RST voltage may possibly exceed the V_{DD} voltage. To avoid this, the C218 capacitor is shorted when the power switch is turned off. If, however, this discharge operation should happen to fail, normal functioning may no longer be possible.

4. D117 TO D121 LIGHTING MODE

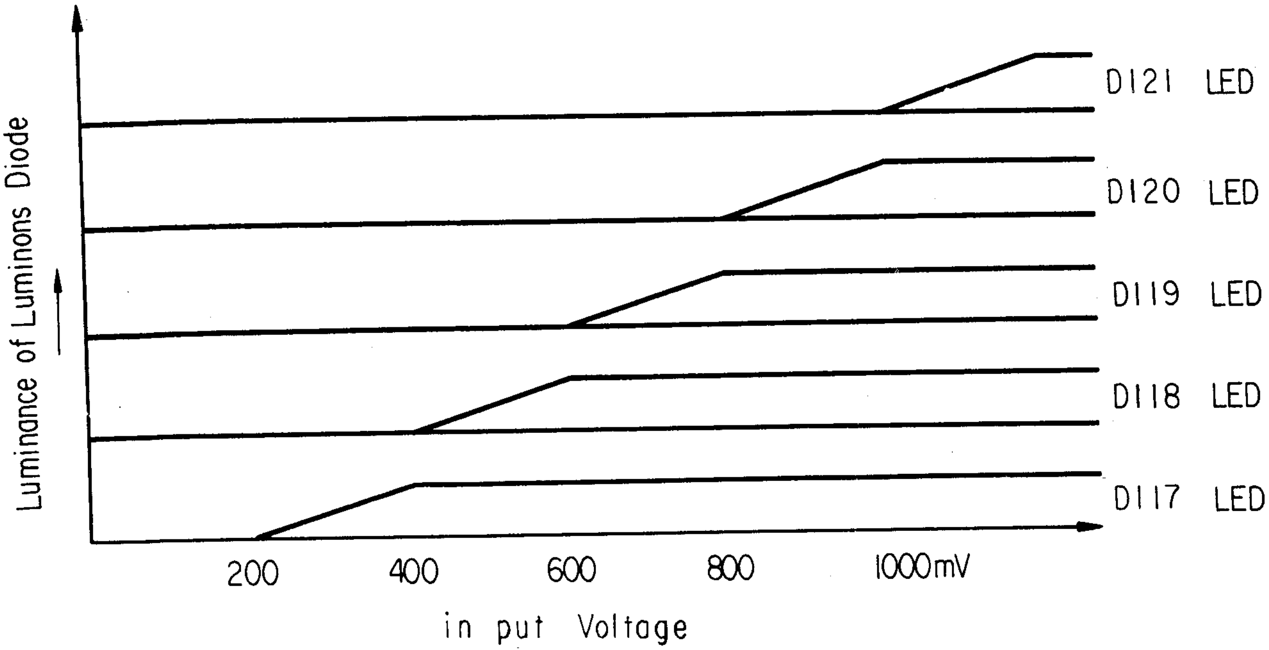


Figure 7.

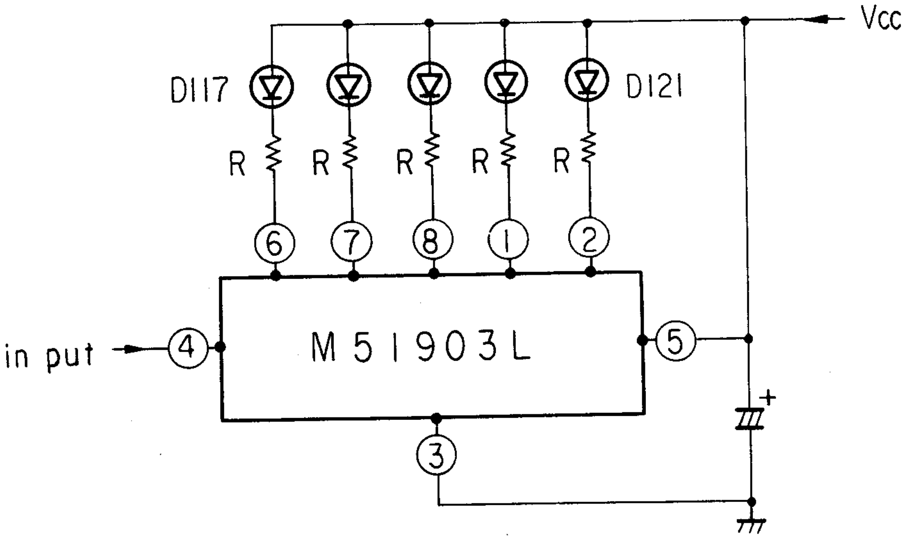

Vcc
D117
D121
R
R
R
R
R
6
7
8
1
2
in put
4
M51903L
5
3
+

Figure 8.

5. DISASSEMBLY INSTRUCTIONS

TOP COVER REMOVAL

1. Remove 4 screws Ⓐ Ⓑ.
2. Remove 2 screws Ⓒ.

Ⓐ 3ϕ x 12mm Tapping
Ⓑ Ⓒ 3ϕ x 8mm Tapping

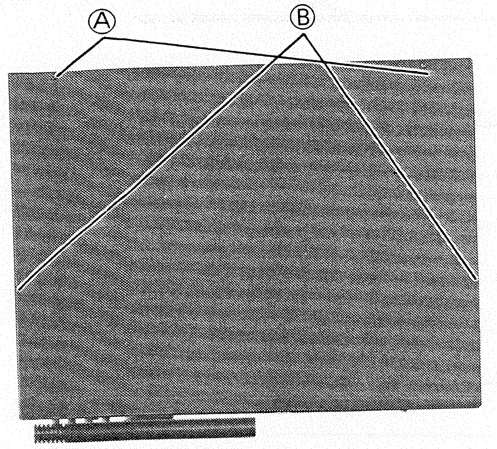


Figure 9.

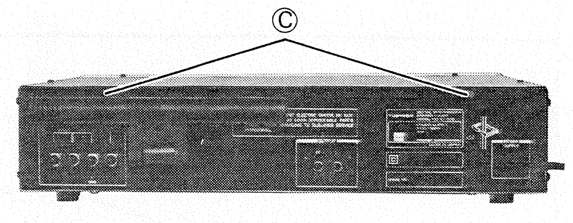


Figure 10.

BOTTOM PLATE REMOVAL

1. Remove 8 screws Ⓓ Ⓔ.

Ⓓ 3ϕ x 8mm
Ⓔ 3ϕ x 8mm Tapping

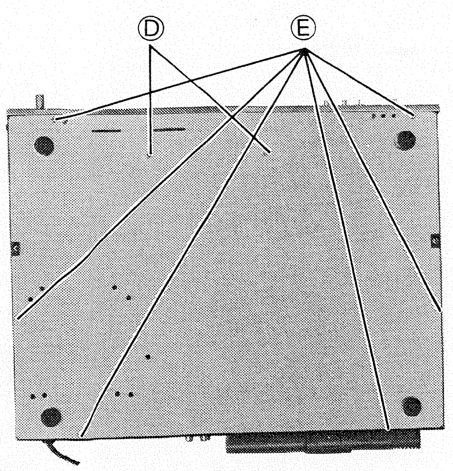


Figure 11.

FRONT PANEL REMOVAL

1. Remove Top Cover.
2. Remove Bottom Plate.
3. Remove 1 Knob Ⓕ.
4. Remove 2 screws Ⓖ.

Ⓖ 3ϕ x 12mm Tapping

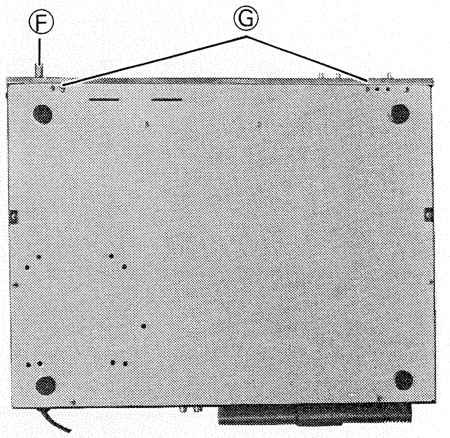


Figure 12.

SYNTHESIZER P.C. BOARD REMOVAL

1. Remove 3 screws and 1 Rivet Ⓗ Ⓘ Ⓙ.

Ⓗ 3ϕ x 50mm Tapping
Ⓘ 3ϕ x 8mm
Ⓙ 3ϕ x 5.5mm Rivet

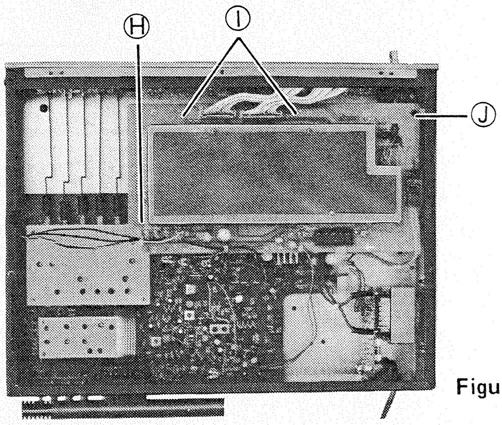


Figure 13.

DISPLAY P.C. BOARD REMOVAL

1. Remove Top Cover
2. Remove Bottom Plate
3. Remove 2 screws Ⓚ .
4. Remove 2 screws Ⓛ .
5. Open as illustrated Ⓜ .
6. Remove 7 screws Ⓝ .

Ⓚ Ⓛ Ⓝ 3ø x 8mm Tapping

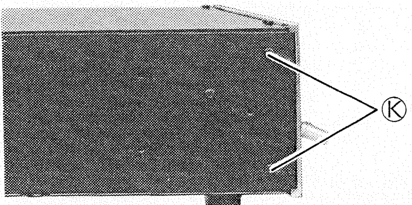


Figure 14.

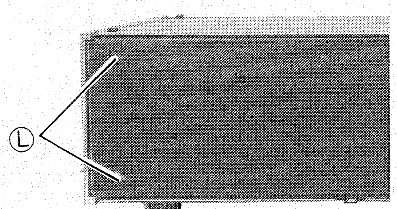


Figure 15.

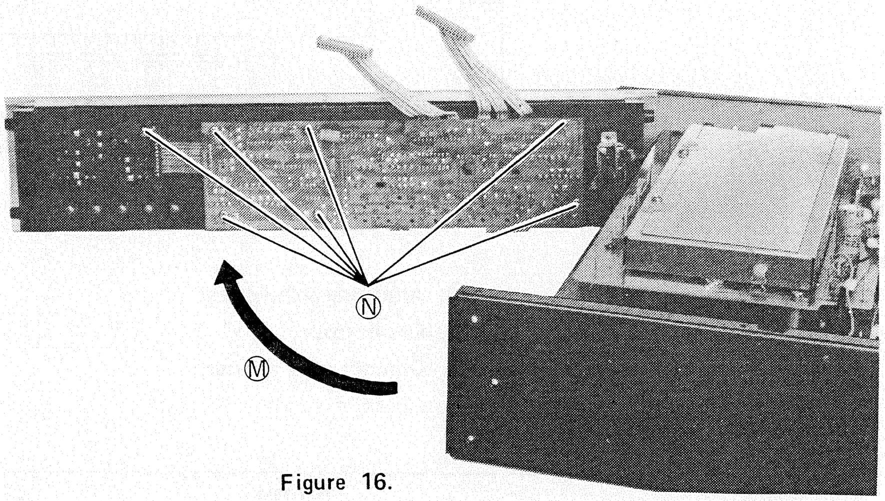


Figure 16.

Removing Display P.C. Board as illustrated will allow ready detection when servicing.

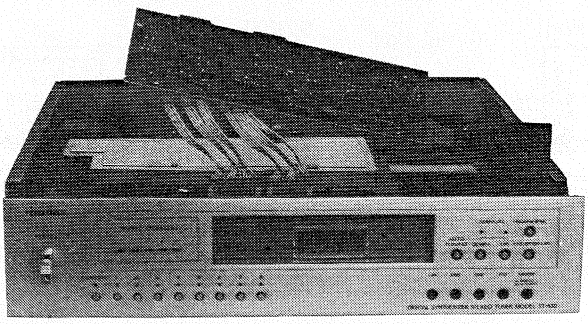


Figure 17.

12. ADJUSTMENTS

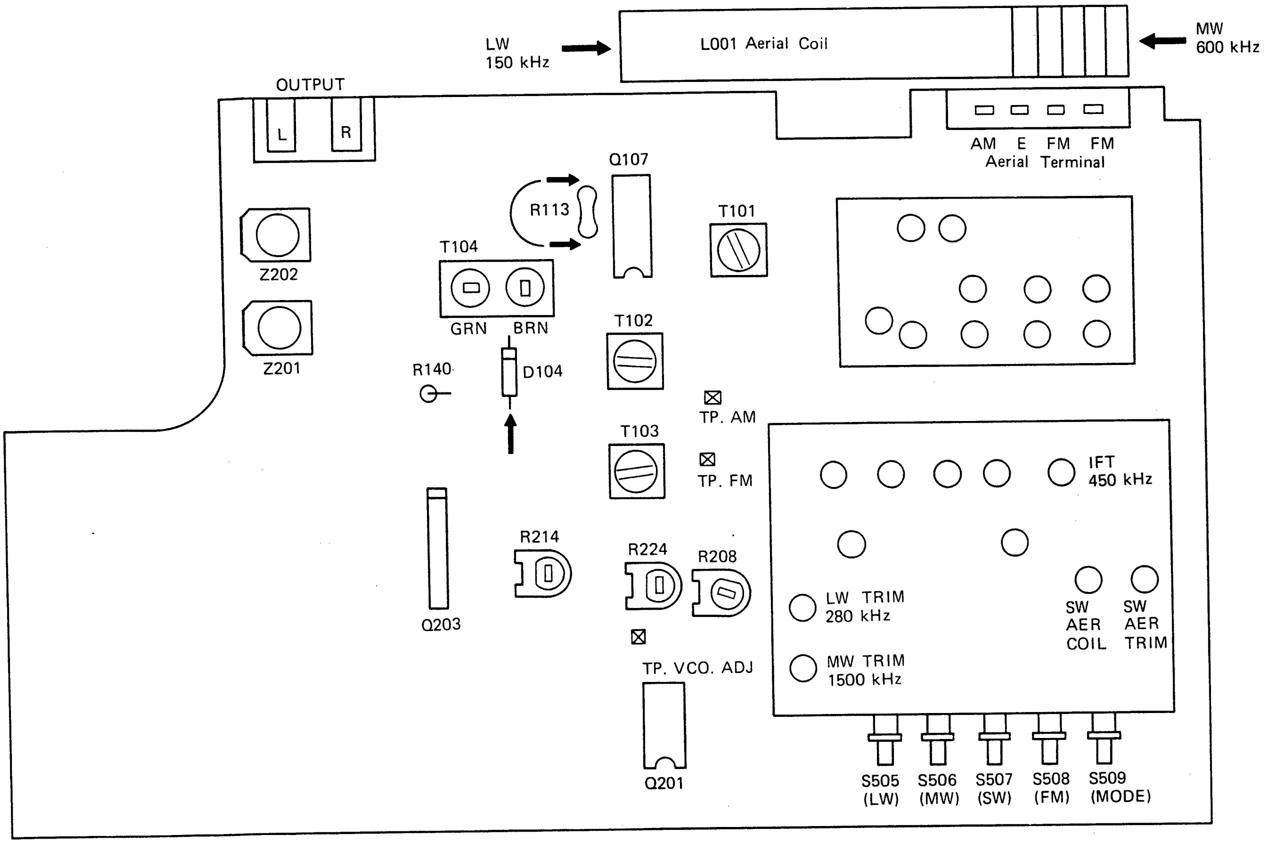

LW
150 kHz
L001 Aerial Coil
MW
600 kHz
OUTPUT
L
R
AM E FM FM
Aerial Terminal
Q107
R113
T101
T104
Z202
GRN BRN
T102
Z201
R140
D104
TP. AM
T103
TP. FM
IFT
450 kHz
R214
R224
R208
Q203
LW TRIM
280 kHz
SW AER COIL
SW AER TRIM
TP. VCO. ADJ
MW TRIM
1500 kHz
Q201
S505 (LW)
S506 (MW)
S507 (SW)
S508 (FM)
S509 (MODE)

Figure 18. Top View of Tuner P.C. Board

AM ADJUSTMENT

Test equipments/Tools required

1. Signal generator (with frequency countor)
2. Sweep generator
3. Test loop Aerial
4. Adjusting screwdriver
5. Oscilloscope
6. Dummy load resister

IF ADJUSTMENT/STOP SIGNAL ADJUSTMENT

Step	Adjustment	Remark
IF Response	T103	Pluck out core to the full.
	T101 T104	Adjust for scope pattern with specified marker (450 kHz) as illustrated in Fig.ⓐ
	T103	Adjust for scope pattern with specified marker (450 kHz) as illustrated in Fig.ⓑ

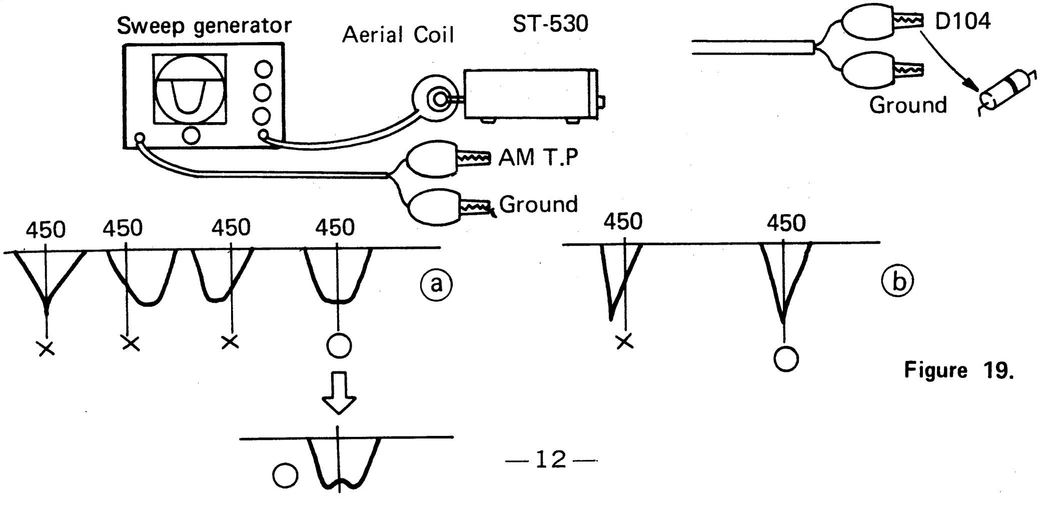

Sweep generator
Aerial Coil
ST-530
AM T.P
Ground
D104
Ground
450
450
450
450
×
×
×
○
ⓐ
450
450
×
○
ⓑ
○

Figure 19.

■ LW ADJUSTMENT

1. Set Function switch to LW.
2. Set signal generator frequency as listed in TABLE 1 LW ADJUSTMENT CHART.
3. Proceed as outlined in the TABLE 1 LW ADJUSTMENT CHART.

TABLE 1 LW ADJUSTMENT CHART

Step	Signal Generator Connection	Signal Generator Frequency	Display Frequency	Connection	Adjustment	Remarks
1	Test loop	150.000 kHz	150 kHz	VTVM across OUTPUT terminal	L001 (LW) LEFT SIDE	Adjust for Maximum
2	Test loop	280.000 kHz	280 kHz	VTVM across OUTPUT terminal	LW AER Trim	Adjust for Maximum
3	Repeat steps 1 and 2 until no further improvement is noticed.					

■ MW ADJUSTMENT

1. Set Function switch to MW.
2. Set signal generator frequency as listed in TABLE 2 MW ADJUSTMENT CHART.
3. Proceed as outlined in the TABLE 2 MW ADJUSTMENT CHART.

TABLE 2 MW ADJUSTMENT CHART

Step	Signal Generator Connection	Signal Generator Frequency	Display Frequency	Connection	Adjustment	Remarks
1	Test loop	600.000 kHz	600 kHz	VTVM across OUTPUT terminal	L001 (MW) RIGHT SIDE	Adjust for Maximum
2	Test loop	1,500.000 kHz	1500 kHz	VTVM across OUTPUT terminal	MW AER Trim	Adjust for Maximum
3	Repeat steps 1 and 2 until no further improvement is noticed.					

■ SW ADJUSTMENT

1. Set Function switch to SW.
2. Set signal generator frequency as listed in TABLE 3 SW ADJUSTMENT CHART.
3. Proceed as outlined in the TABLE 3 SW ADJUSTMENT CHART.

TABLE 3 SW ADJUSTMENT CHART

Step	Signal Generator Connection	Signal Generator Frequency	Display Frequency	Connection	Adjustment	Remarks
1	Dummy load AM Aerial Terminal	5.900 MHz	5.9 MHz	VTVM across OUTPUT	SW AER Coil	Adjust for Maximum
2		6.300 MHz	6.3 MHz	VTVM across OUTPUT	SW AER Trim	Adjust for Maximum
3	Repeat steps 1 and 2 until no further improvement is noticed.					

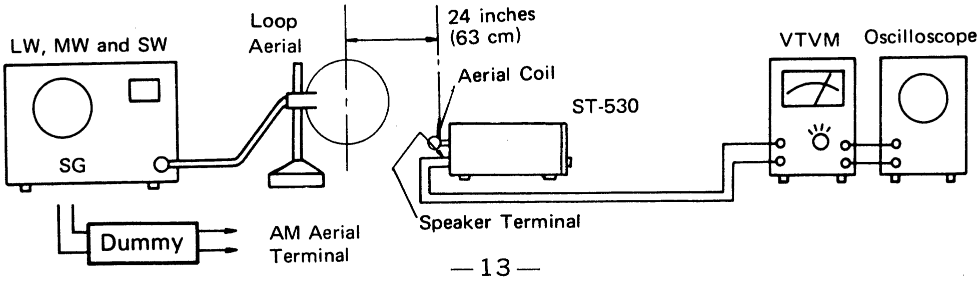


Figure 20.

■ FM IF ADJUSTMENT

1. Set Function switch to FM.
2. Set signal generator frequency as listed in TABLE 4 FM IF ADJUSTMENT CHART.
3. Proceed as outlined in the TABLE 4 FM IF ADJUSTMENT CHART.

TABLE 4 FM-IF ADJUSTMENT CHART

Step	Signal Generator Connection	Signal Generator Frequency	Display Frequency	Meter or Oscilloscope Connection	Adjustment	Remarks
1	Connect FM signal generator to FM Aerial Terminal. Connect the modulator to signal generator.	98.000 MHz 66 dB	98 MHz	Connect Tester to Resistor R113	T104 BRN ⊘ ⊘	Adjust for R113 Voltage 0 V
2				VTVM across Speaker	T104 GRN ⊘ ⊘	Adjust for Minimum Distortion
3	Repeat steps 1 and 2.					

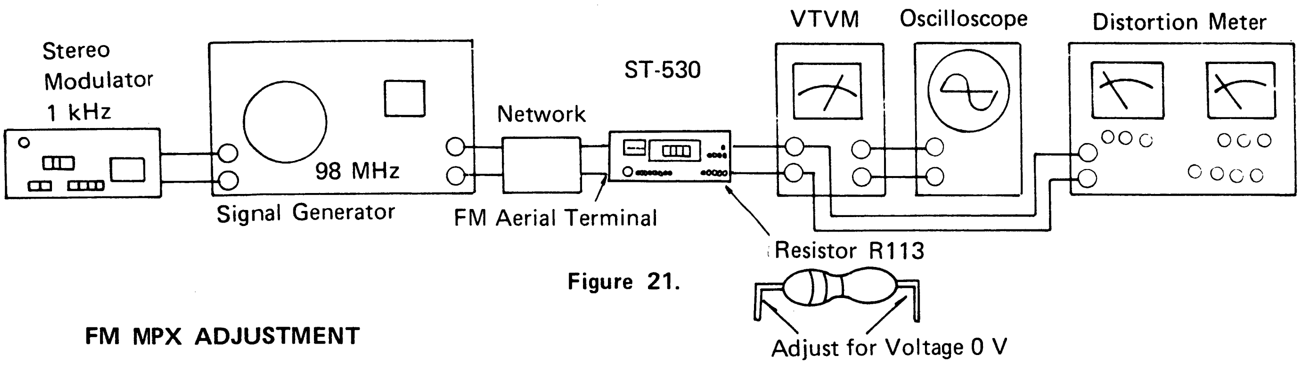

Stereo Modulator 1 kHz
98 MHz
Signal Generator
Network
ST-530
FM Aerial Terminal
VTVM
Oscilloscope
Distortion Meter
Resistor R113
Adjust for Voltage 0 V

Figure 21.

FM MPX ADJUSTMENT

1. Frequency Counter
2. Signal Generator
3. Stereo Modulator
4. 300 ohm Dummy Aerial

Free-running Frequency Adjustment	Connect a frequency to the Test Point (VCO) and Adjust the R224 for 76 kHz reading counter with no-signal input.

PILOT CANCEL ADJUSTMENT

Signal Generator Frequency	Switch Position	Display Frequency	Connection		Adjustment	Remarks
			Input	Output		
98.000 MHz (60 dB)	Function FM Push Mode STEREO STEREO LED Lighting	98.00 MHz	Connect Signal Generator to 300 ohm Aerial Terminal. Connect Stereo Modulator to Signal Genelator. Set modulator signal to Pilot (19 kHz) only.	Connect VTVM to OUTPUT Terminal. Connect Oscilloscope to VTVM.	R208	Adjust for Pilot Signal Minimum.

SEPARATION ADJUSTMENT

Signal Generator Frequency	Switch Position	Display Frequency	Connection		Adjustment	Remarks
			Input	Output		
98.000 MHz (60 dB)	Function FM Push Mode STEREO STEREO LED Lighting	98.00 MHz	Connect Signal Generator to 300 ohm Aerial Terminal. Connect Stereo Modulator to Signal Generator.	Connect VTVM to OUTPUT Terminal. Connect Oscilloscope to VTVM.	R214	Stereo Modulator Switch L Position. Adjust so the OUTPUT of Rch is minimum as compaired with Lch.
Set Stereo Modulator Switch to R position and observe the Lch and Rch.						

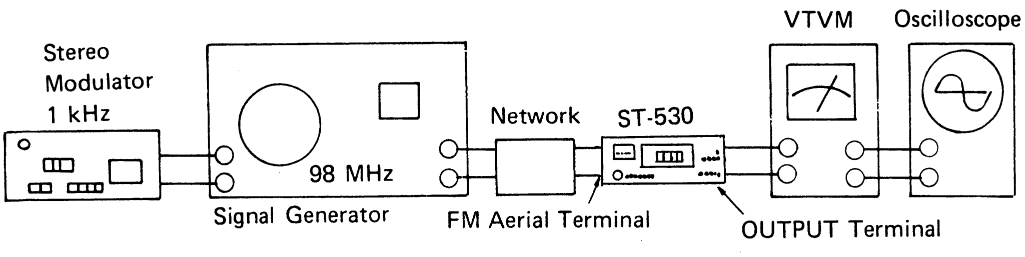

Stereo Modulator 1 kHz
98 MHz
Signal Generator
Network
ST-530
FM Aerial Terminal
VTVM
Oscilloscope
OUTPUT Terminal

Figure 22.

7. BLOCK DIAGRAM

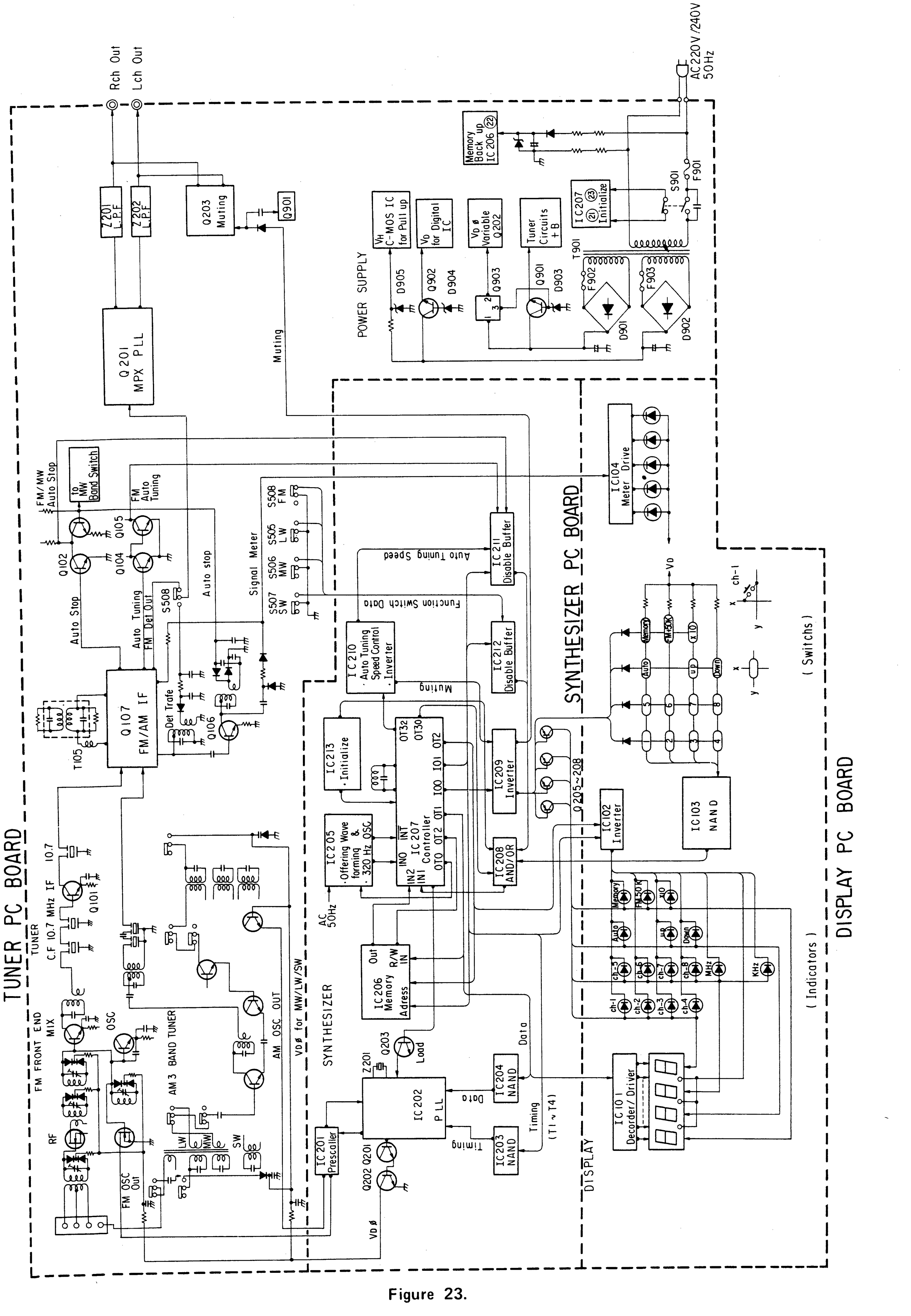
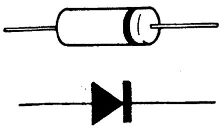
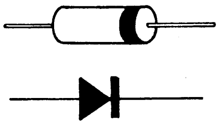

TUNER PC BOARD
SYNTHESIZER PC BOARD
DISPLAY PC BOARD
POWER SUPPLY
SYNTHESIZER
DISPLAY
Rch Out
Lch Out
AC220V/240V
50Hz
Z201 L.P.F
Z202 L.P.F
Q203 Muting
Q901
Muting
Q201 MPX PLL
Memory Back up IC206 ㉒
IC207 ㉑ ㉓ Initialize
S901
F901
T901
F902
F903
D901
D902
VH C-MOS IC for Pull up
Vo for Digital IC
Vo ø Variable Q202
Tuner Circuits +B
D905
Q902
D904
Q903
Q901
D903
FM/MW Auto Stop
To MW Band Switch
FM Auto Tuning
Q102
Q105
Q104
Auto Stop
Auto Tuning
FM Det Out
S508
Auto stop
Signal Meter
S507 SW
S506 MW
S505 LW
S508 FM
Q107 FM/AM IF
T105
Det Trafo
Q106
10.7
TUNER C.F 10.7 MHz IF
Q101
FM FRONT END
MIX
OSC
RF
FM OSC Out
AM 3 BAND TUNER
LW
MW
SW
AM OSC OUT
VDø for MW/LW/SW
IC211 Disable Buffer
IC212 Disable Buffer
Auto Tuning Speed
Function Switch Data
IC210 · Auto Tuning Speed Control · Inverter
Muting
IC213 · Initialize
IC205 · Offering Wave forming & · 320 Hz OSC
AC 50Hz
IC207 Controller
INO INT
IN2 IN1
OTO OT2 OT1 IO0 IO1 OT2 OT30 OT32
IC209 Inverter
IC208 AND/OR
IC206 Memory
Out R/W IN
Adress
Q205~208
IC202 PLL
Z201
Q203
Load
Data
IC204 NAND
IC203 NAND
Timing
Timing (T1~T4)
IC201 Prescaler
Q202 Q201
VDø
IC104 Meter Drive
Vo
IC102 Inverter
IC103 NAND
Memory
FM50K
x10
Auto
up
Down
1 2 3 4 5 6 7 8
ch-1
x
y
(Switchs)
Memory FM50K x10
Auto Up Down
ch-5 ch-6 ch-7 ch-8 MHz KHz
ch-1 ch-2 ch-3 ch-4
(Indicators)
IC101 Decorder/Driver

Figure 23.

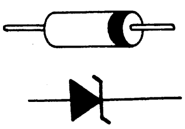
8. EXTERNAL APPEARANCE OF TRANSISTOR IC'S AND DIODES



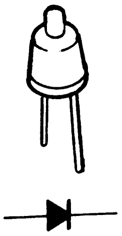
1N60



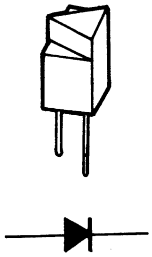
1S1555
1S2462



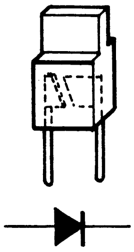
02Z5.6A
02Z8.2A
05Z8.2U
02Z15A



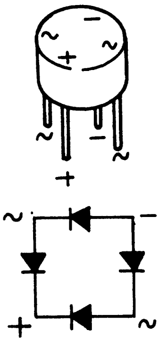
AR2433D-RED



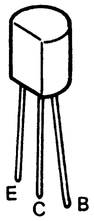
PG5531T-GRN
PR5531T-RED



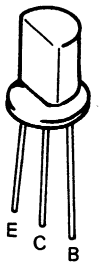
GL-9PR2



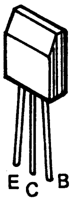
WL02M



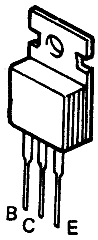
2SC1815
2SC1923



2SA561

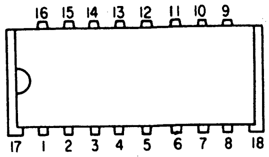


2SA509

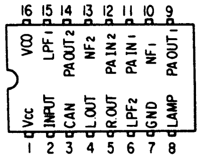


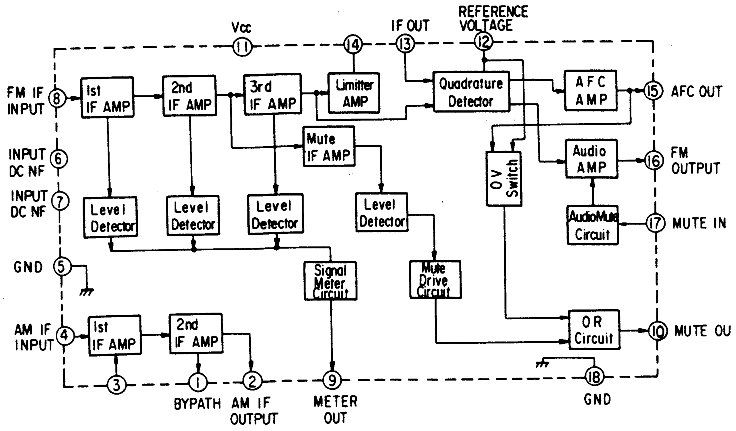
2SD234

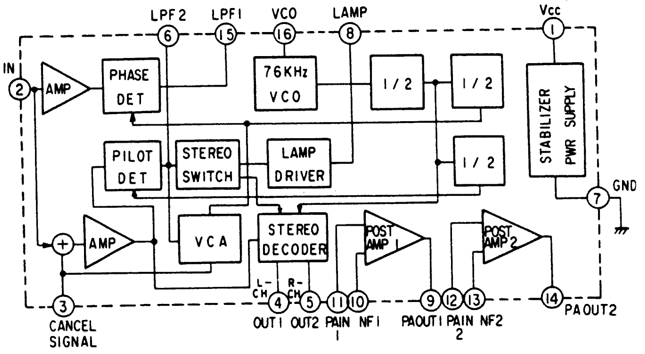
HA11211


16 15 14 13 12 11 10 9
17 1 2 3 4 5 6 7 8 18

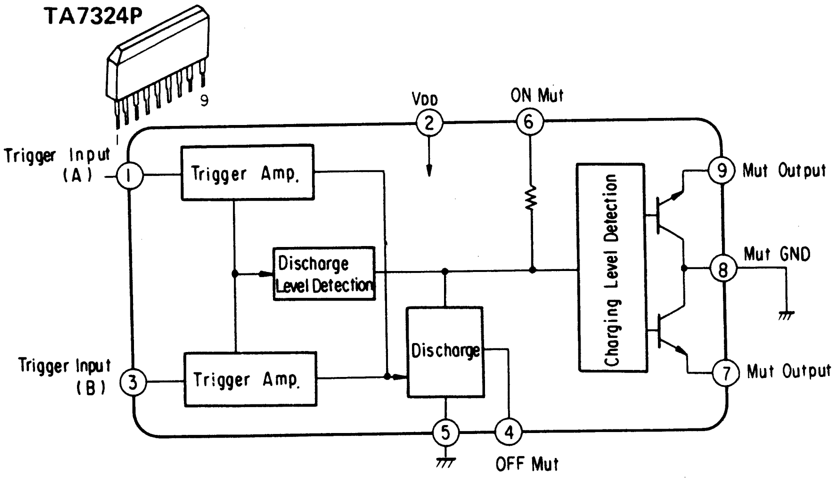
TA7624P


16 15 14 13 12 11 10 9
VCO
LPF1
PAOUT2
NF2
PAIN2
PAIN1
NF1
PAOUT1
Vcc
INPUT
CAN
L OUT
R OUT
LPF2
GND
LAMP
1 2 3 4 5 6 7 8


Vcc
IF OUT
REFERENCE VOLTAGE
FM IF INPUT
1st IF AMP
2nd IF AMP
3rd IF AMP
Limitter AMP
Quadrature Detector
AFC AMP
AFC OUT
Mute IF AMP
INPUT DC NF
INPUT DC NF
0V Switch
Audio AMP
FM OUTPUT
Level Detector
Level Detector
Level Detector
Level Detector
AudioMute Circuit
MUTE IN
GND
Signal Meter Circuit
Mute Drive Circuit
AM IF INPUT
1st IF AMP
2nd IF AMP
OR Circuit
MUTE OU
BYPATH
AM IF OUTPUT
METER OUT
GND

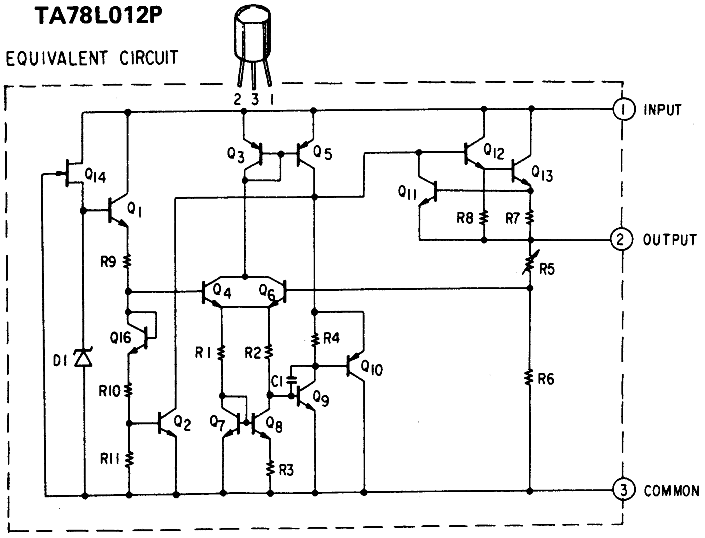

LPF2
LPF1
VCO
LAMP
Vcc
IN
AMP
PHASE DET
76KHz VCO
1/2
1/2
1/2
STABILIZER PWR SUPPLY
GND
PILOT DET
STEREO SWITCH
LAMP DRIVER
AMP
VCA
STEREO DECODER
POST AMP 1
POST AMP 2
L-CH
R-CH
CANCEL SIGNAL
OUT1
OUT2
PAIN 1
NF1
PAOUT1
PAIN 2
NF2
PAOUT2

TA7324P

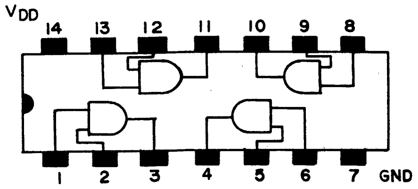

9
VDD
ON Mut
Trigger Input (A)
Trigger Amp.
Discharge Level Detection
Charging Level Detection
Mut Output
Mut GND
Discharge
Trigger Input (B)
Trigger Amp.
Mut Output
OFF Mut

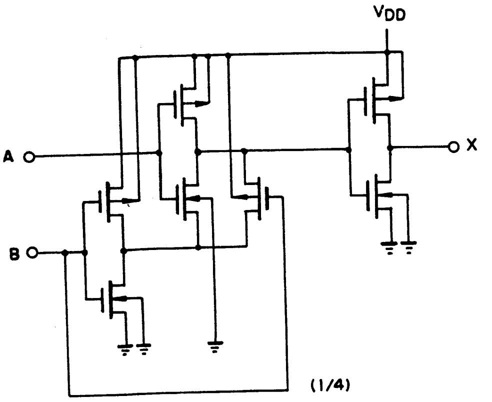
TA78L012P

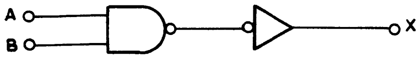
EQUIVALENT CIRCUIT


2 3 1
INPUT
Q14
Q1
Q3
Q5
Q12
Q13
Q11
R8
R7
OUTPUT
R5
R9
Q4
Q6
Q16
D1
R1
R2
R4
Q10
C1
Q9
R10
Q2
Q7
Q8
R6
R11
R3
COMMON

TC4081P

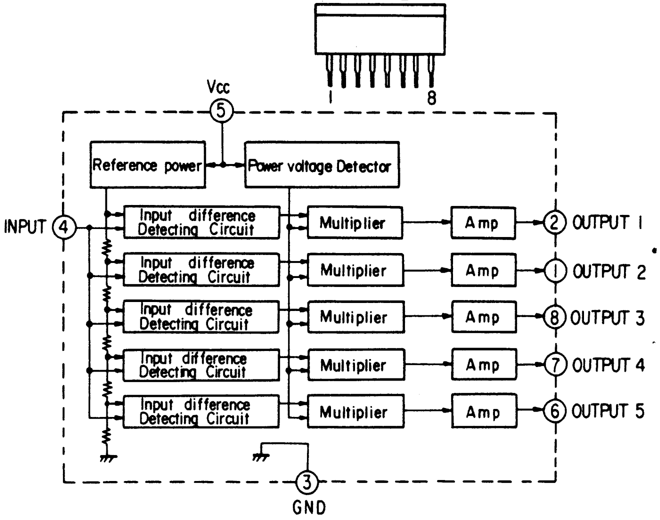

V_{DD}
14
13
12
11
10
9
8
1
2
3
4
5
6
7
GND





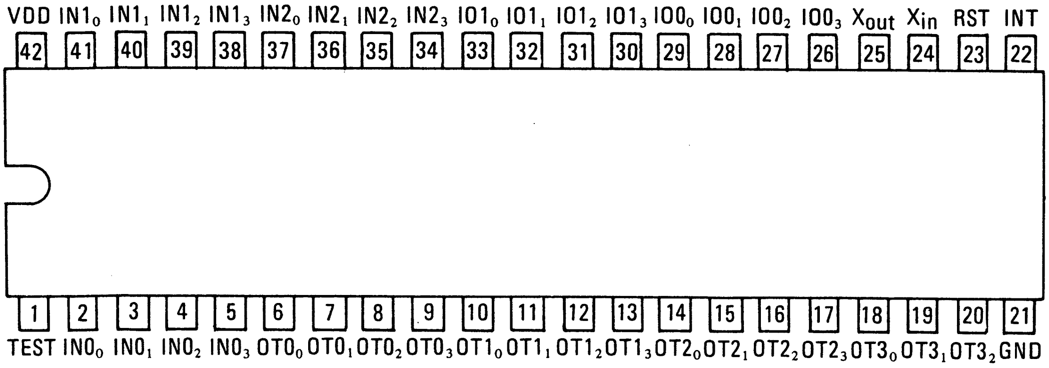
Input		Output
A	B	X
L	L	L
L	H	L
H	L	L
H	H	H

M51903L


1
8
Vcc
5
Reference power
Power voltage Detector
INPUT 4
Input difference Detecting Circuit
Input difference Detecting Circuit
Input difference Detecting Circuit
Input difference Detecting Circuit
Input difference Detecting Circuit
Multiplier
Multiplier
Multiplier
Multiplier
Multiplier
Amp
Amp
Amp
Amp
Amp
2 OUTPUT 1
1 OUTPUT 2
8 OUTPUT 3
7 OUTPUT 4
6 OUTPUT 5
3
GND

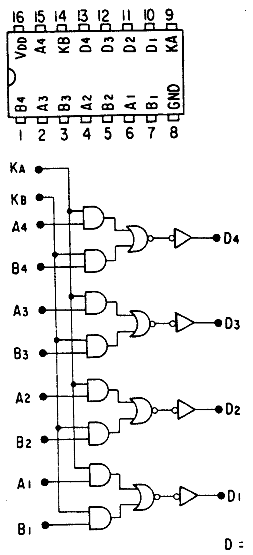
TMP4315P-0202

1. Signal Terminals


VDD
$\mathrm{IN1}_0$
$\mathrm{IN1}_1$
$\mathrm{IN1}_2$
$\mathrm{IN1}_3$
$\mathrm{IN2}_0$
$\mathrm{IN2}_1$
$\mathrm{IN2}_2$
$\mathrm{IN2}_3$
$\mathrm{IO1}_0$
$\mathrm{IO1}_1$
$\mathrm{IO1}_2$
$\mathrm{IO1}_3$
$\mathrm{IO0}_0$
$\mathrm{IO0}_1$
$\mathrm{IO0}_2$
$\mathrm{IO0}_3$
X_{out}
X_{in}
RST
INT
42
41
40
39
38
37
36
35
34
33
32
31
30
29
28
27
26
25
24
23
22
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
TEST
$\mathrm{IN0}_0$
$\mathrm{IN0}_1$
$\mathrm{IN0}_2$
$\mathrm{IN0}_3$
$\mathrm{OT0}_0$
$\mathrm{OT0}_1$
$\mathrm{OT0}_2$
$\mathrm{OT0}_3$
$\mathrm{OT1}_0$
$\mathrm{OT1}_1$
$\mathrm{OT1}_2$
$\mathrm{OT1}_3$
$\mathrm{OT2}_0$
$\mathrm{OT2}_1$
$\mathrm{OT2}_2$
$\mathrm{OT2}_3$
$\mathrm{OT3}_0$
$\mathrm{OT3}_1$
$\mathrm{OT3}_2$
GND

Pin No.	Symbol	Function	Remarks H......High Level L......Low Level
①	TEST	———	Should be connected to V$_{DD}$
②	IN0$_0$	Adjustment Timer	"H" : Min. Down Count, "L" : Hour Up Count
③	IN0$_1$	50 Hz/60 Hz	"H" : 50 Hz "L" : 60 Hz
④	IN0$_2$	AC IN	For Timer
⑤	IN0$_3$	INT	Interruption Frequency Input
⑥	OT0$_0$	Speed Control	"L" level when normal, "H" level when speed control input ㊴ applied.
⑦	OT0$_1$	Memory CE	"H" : memory inactive "L" : memory read/write possible
⑧	OT0$_2$	Memory R/W	"H" : memory read out "L" : memory write in
⑨	OT0$_3$	PLL Load	"H" : normal "L" : frequency data change
⑩	OT1$_0$	Display PLL Data Output Memory	Display data synchronized with IO0$_{0\sim3}$
⑪	OT1$_1$		PLL data synchronized with OT3$_0$ (load)
⑫	OT1$_2$		Memory data synchronized with OT0$_1$
⑬	OT1$_3$		
⑭	OT2$_0$	Memory Address Indicator Data Output Display Blanking	Memory address synchronized with OT0$_1$
⑮	OT2$_1$		Indicator data synchronized with IO0$_0$
⑯	OT2$_2$		Display blanking when ⑩ ~ ⑬ are 0 with ⑰ at "H".
⑰	OT2$_3$		
⑱	OT3$_0$	Data Select	"H" : control key data, "L" : function switch data synthesizer mode INT synchronized
⑲	OT3$_1$	Power ON Output	Normally "L" level, changes to "H" level when auto timer sleep switch on
⑳	OT3$_2$	Muting	"H" : muting on, "L" : normal
㉑	GND	Earth	Holding at the very minimum voltage level
㉒	INT	Interruption	"L" : interruption, approx. 370 Hz
㉓	RST	Initialize	"L" : initialize, all outputs become "H" level
㉔	X$_{IN}$	X'tal OSC	Clock oscillation, approx. 370 kHz selected as frequency which will not interfere with operations.
㉕	X$_{OUT}$		
㉖	IO0$_3$	T$_4$ Digit Timing	Timing Signal which starts from T$_1$ and ends at T$_4$, synchronized with INT.
㉗	IO0$_2$	T$_3$	
㉘	IO0$_1$	T$_2$	
㉙	IO0$_0$	T$_1$	
㉚	IO1$_3$	Memory Address PLL Digit Data Indicator Output Function Key	Memory ㉝ ㉜ digit designation, ㉛ ㉚ band designation, OT0$_1$ synchronization.
㉛	IO1$_2$		PLL ㉝ 1st, ㉜ 2nd, ㉛ 3rd, ㉚ 4th digit OT0$_3$ synchronization.
㉜	IO1$_1$		Indicator T$_1$ – 1st, T$_2$ – 2nd, T$_3$ – 3rd, T$_4$ – 4th synchronization
㉝	IO1$_0$		
㉞	IN2$_3$	Memory Data PLL Indicator Mode Input	Synchronized with OT0$_1$ for data input from external memory. This signal also contains preset channel data. If "H" level applied to IN2$_1$ while OT0$_1$ is also at "H" level, display changes from "time" to "frequency" and then display mode designated by pin ㊲ . Pin ㊲ "H" level: frequency display, "L" level: time display.
㉟	IN2$_2$		
㊱	IN2$_1$		
㊲	IN2$_0$		
㊳	IN1$_3$	Control Key Data Input Function Switch Data Input Synthesizer Mode	Control key data transferred according to T$_1$ ~ T$_4$ timing, while function switch synthesizer mode data transferred according to IO1$_{0,1,3}$ timing.
㊴	IN1$_2$		
㊵	IN1$_1$		
㊶	IN1$_0$		
㊷	V$_{DD}$	V$_{DD}$	+5V

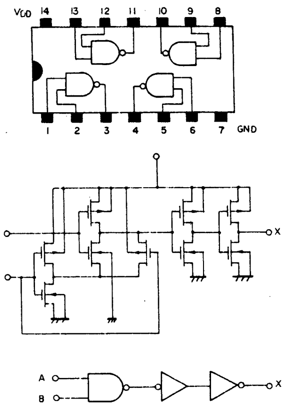
TC 4019P


VDD
A4
KB
D4
D3
D2
D1
KA
B4
A3
B3
A2
B2
A1
B1
GND
KA
KB
A4
B4
A3
B3
A2
B2
A1
B1
D4
D3
D2
D1

D = A·KA + B·KB

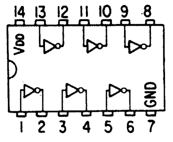
INPUT				OUT
A	KA	B	KB	D
L	L	L	L	L
L	L	L	H	L
L	L	H	L	L
L	L	H	H	H
L	H	L	L	L
L	H	L	H	L
L	H	H	L	L
L	H	H	H	H
H	L	L	L	L
H	L	L	H	L
H	L	H	L	L
H	L	H	H	H
H	H	L	L	H
H	H	L	H	H
H	H	H	L	H
H	H	H	H	H

TC 4011

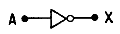


INPUT		OUTPUT
A	B	X
L	L	H
L	H	H
H	L	H
H	H	L

TC 4069UBP

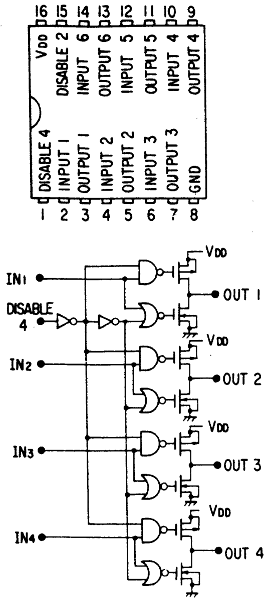


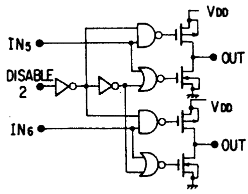
(1/6 TC-4069UBP)



INPUT	OUT
A	X
L	H
H	L

TC 5012P

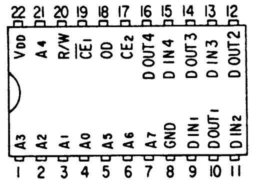

VDD
DISABLE 2
INPUT 6
OUTPUT 6
INPUT 5
OUTPUT 5
INPUT 4
OUTPUT 4
DISABLE 4
INPUT 1
OUTPUT 1
INPUT 2
OUTPUT 2
INPUT 3
OUTPUT 3
GND
IN1
DISABLE 4
IN2
IN3
IN4
OUT 1
OUT 2
OUT 3
OUT 4
VDD


IN5
DISABLE 2
IN6
VDD
OUT 5
OUT 6

DISABLE INPUT		INPUT	OUTPUT	
DIS. 4	DIS. 2			
L	L	L	L	
L	L	H	H	
L	H	☆	HZ	*
H	L	☆	HZ	**
H	H	☆	HZ	***

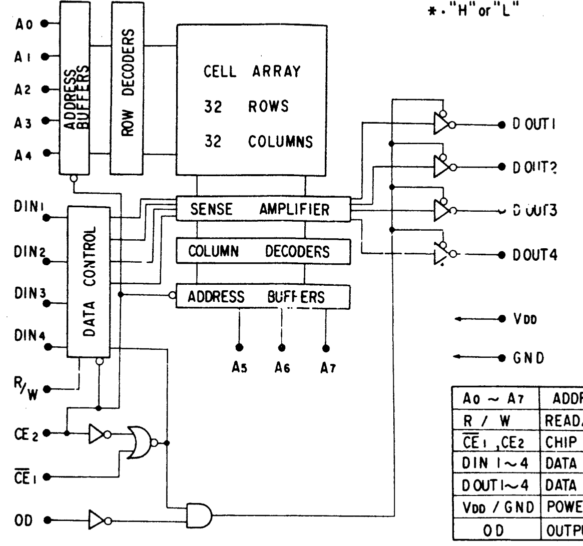
☆	"H" or "L"	
*	OUTPUT 1 ~ 4	High Impedance
**	OUTPUT 5, 6	〃
***	OUTPUT 1 ~ 6	〃

TC 5501P


VDD
A4
R/W
CE1
OD
CE2
DOUT4
DIN4
DOUT3
DIN3
DOUT2
A3
A2
A1
A0
A5
A6
A7
GND
DIN1
DOUT1
DIN2

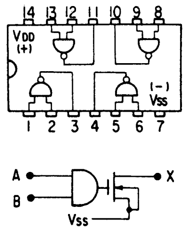
$\overline{CE_1}$	CE_2	R/W	OD	DIN	$A_0 \sim A_7$	Dout	OPERATION
H	*	*	*	*	Changing	High Impedance	Precharging
*	L	*	*	*	Changing	↑	Precharging
L	H	L	H	H/L	Stable	↑	Write "H/L"
L	H	L	L	H/L	Stable	READ H/L	Write / Read "H/L"
L	H	H	L	*	Stable	READ H/L	Read Cycle

* · "H" or "L"


A0
A1
A2
A3
A4
ADDRESS BUFFERS
ROW DECODERS
CELL ARRAY
32 ROWS
32 COLUMNS
SENSE AMPLIFIER
COLUMN DECODERS
ADDRESS BUFFERS
DATA CONTROL
DIN1
DIN2
DIN3
DIN4
R/W
CE2
CE1
OD
A5
A6
A7
DOUT1
DOUT2
DOUT3
DOUT4
VDD
GND

$A_0 \sim A_7$	ADDRESS INPUTS
R / W	READ/WRITE INPUT
$\overline{CE_1}$, CE_2	CHIP ENABLE
DIN 1~4	DATA INPUT
DOUT1~4	DATA OUTPUT
VDD / GND	POWER SUPPLY
OD	OUTPUT DISABLE

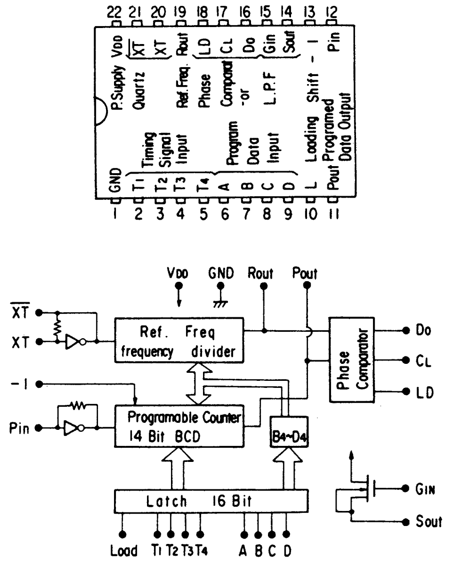
TC 5029P


VDD (+)
(-) Vss
A
B
X
Vss

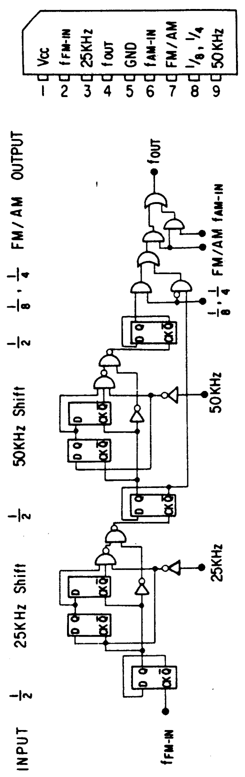
INPUTS		OUTPUT
B	A	X
L	L	HZ
L	H	HZ
H	L	HZ
H	H	L

HZ : High Impedance

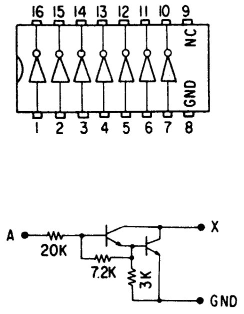
TC 9123P


Vdd
$\overline{XT}$
XT
Rout
LD
Do
Gin
Sout
Pin
P.Supply
Quartz
Ref. Freq
Phase Comparator
or L.P.F
Loading Shift
Pout Programmed Data Output
GND
T1
T2
T3
T4
Timing Signal Input
Program Data Input
A
B
C
D
L
Ref. Freq frequency divider
Phase Comparator
Programable Counter 14 Bit BCD
B4~D4
Latch 16 Bit
Load
VDD
GND
Rout
Pout
CL
LD
-1
GIN
Sout

TD 6102P


Vcc
fFM-IN
25KHz
four
GND
fAM-IN
FM/AM
1/6, 1/4
50KHz
OUTPUT
FM/AM
÷1/4
÷1/8
÷1/2
50KHz Shift
÷1/2
25KHz Shift
÷1/2
INPUT
four
fFM-IN
fAM-IN
FM/AM
50KHz
25KHz

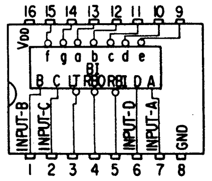
TD 62105P


NC
GND
A
20K
7.2K
3K
X
GND

INPUT	OUTPUT
A	X
L	HZ
H	L

HZ : High Impedance

TD 34247AP


Vdd
f
g
a
b
c
d
e
B
C
LT
RBO
RBI
D
A
INPUT-B
INPUT-C
INPUT-D
INPUT-A
GND

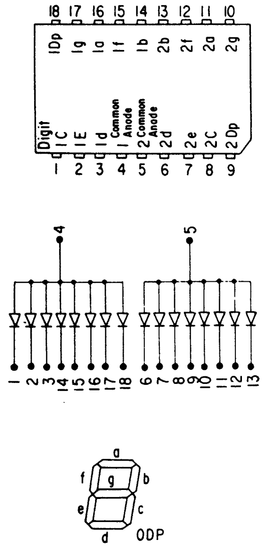
BI or RBO ---- Blanking Input or Ripple Blanking Output

LT --- Lamp Test Input

RBI--- Ripple Blanking Input

FUNCTION	INPUT						OUTPUT								NOTE
	LT	RBI	D	C	B	A	BI/RBO	a	b	c	d	e	f	g	
0	H	H	L	L	L	L	H	ON	ON	ON	ON	ON	ON	OFF	1
1	H	X	L	L	L	H	H	OFF	ON	ON	OFF	OFF	OFF	OFF	1
2	H	X	L	L	H	L	H	ON	ON	OFF	ON	ON	OFF	ON	2
3	H	X	L	L	H	H	H	ON	ON	ON	ON	OFF	OFF	ON	3
4	H	X	L	H	L	L	H	OFF	ON	ON	OFF	OFF	ON	ON	4
5	H	X	L	H	L	H	H	ON	OFF	ON	ON	OFF	ON	ON	5
6	H	X	L	H	H	L	H	OFF	OFF	ON	ON	ON	ON	ON	6
7	H	X	L	H	H	H	H	ON	ON	ON	OFF	OFF	OFF	OFF	7
8	H	X	H	L	L	L	H	ON	ON	ON	ON	ON	ON	ON	8
9	H	X	H	L	L	H	H	ON	ON	ON	OFF	OFF	ON	ON	9
10	H	X	H	L	H	L	H	OFF	OFF	OFF	ON	ON	OFF	ON	10
11	H	X	H	L	H	H	H	OFF	OFF	ON	ON	OFF	OFF	ON	11
12	H	X	H	H	L	L	H	OFF	ON	OFF	OFF	OFF	ON	ON	12
13	H	X	H	H	L	H	H	ON	OFF	OFF	ON	OFF	ON	ON	13
14	H	X	H	H	H	L	H	OFF	OFF	OFF	ON	ON	ON	ON	14
15	H	X	H	H	H	H	H	OFF	OFF	OFF	OFF	OFF	OFF	OFF	15
BI	X	X	X	X	X	X	L	OFF	OFF	OFF	OFF	OFF	OFF	OFF	2
RBI	H	L	L	L	L	L	L	OFF	OFF	OFF	OFF	OFF	OFF	OFF	3
LT	L	X	X	X	X	X	H	ON	ON	ON	ON	ON	ON	ON	4

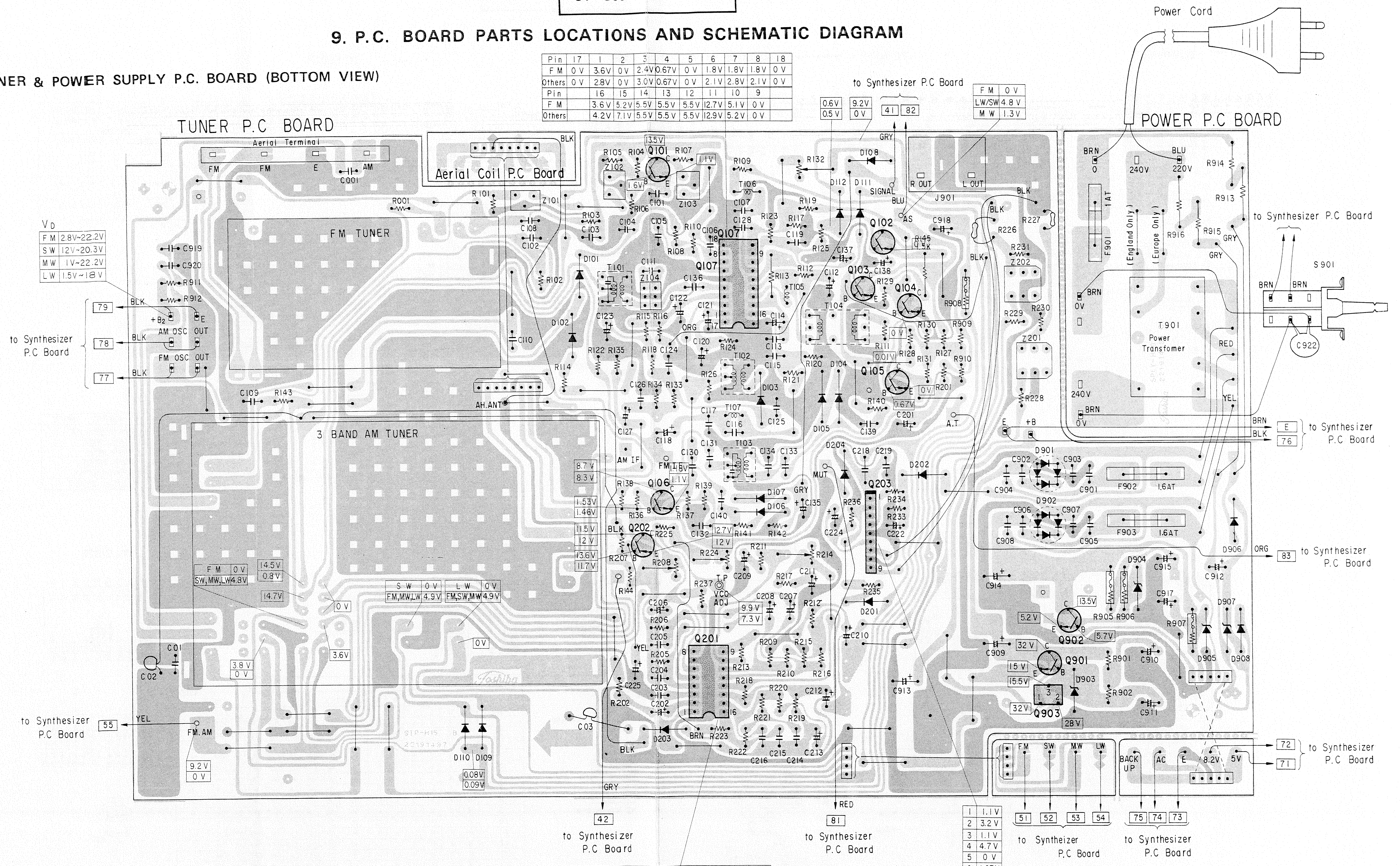
TLG 325


Dp
1g
1a
1f
1b
2g
2a
2f
2b
2c
Digit 1
1c
1e
1d
1 Common Anode
2 Common Anode
2d
2e
2Dp
4
5
a
b
c
d
e
f
g
DP

9. P.C. BOARD PARTS LOCATIONS AND SCHEMATIC DIAGRAM

TUNER & POWER SUPPLY P.C. BOARD (BOTTOM VIEW)

Pin	17	1	2	3	4	5	6	7	8	18
F M	0 V	3.6V	0 V	2.4V	0.67V	0 V	1.8V	1.8V	1.8V	0 V
Others	0 V	2.8V	0 V	3.0V	0.67V	0 V	2.1V	2.8V	2.1V	0 V
Pin		16	15	14	13	12	11	10	9	
F M		3.6V	5.2V	5.5V	5.5V	5.5V	12.7V	5.1V	0 V	
Others		4.2V	7.1V	5.5V	5.5V	5.5V	12.9V	5.2V	0 V	

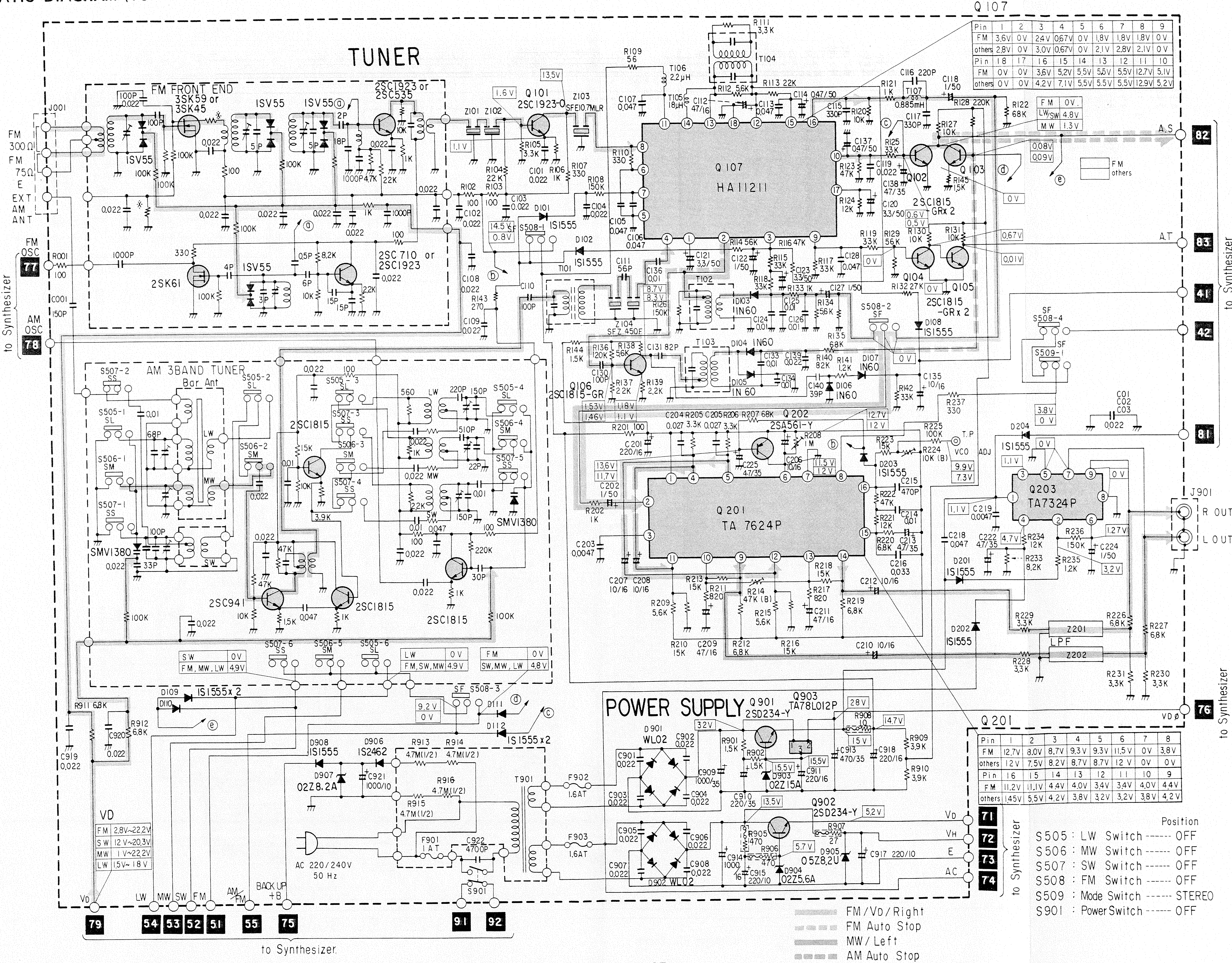

TUNER P.C BOARD
Aerial Terminal
FM
FM
E
AM
C001
Aerial Coil P.C Board
BLK
R001
R101
Z101
FM TUNER
3 BAND AM TUNER
VD
F M 2.8V~22.2V
S W 12V~20.3V
M W 1V~22.2V
L W 1.5V~18V
C919
C920
R911
R912
+B2
E
AM OSC OUT
FM OSC OUT
79
78
77
to Synthesizer P.C Board
C110
C109
R143
AH.ANT
F M 0V
SW,MW,LW 4.8V
14.5V
0.8V
14.7V
0 V
S W 0V
FM,MW,LW 4.9V
L W 0V
FM,SW,MW 4.9V
3.6V
3.8V
0 V
0V
C01
C02
YEL
55
FM.AM
9.2V
0 V
D110 D109
0.08V
0.09V
C03
BLK
GRY
42
13.5V
Q101
R105 R104 R107
Z102
1.1V
1.6V
R106
C101
Z103
R103
C103
C104
C105
C108
C102
R102
D101
T101
Z104
C111
R110
C106
R108
Q107
C136
C122
C121
C123
D102
R115 R116
ORG
C120
R124
T102
R122 R135
R118 C124
R114
R126
C126 R134 R133
D103
C127
C117
T107
C116
C125
C118
AM IF
C130
C131
T103
C134 C133
8.7V
8.3V
FM 1.5V
1.1V
R138
Q106
R139
D107
D106
GRY
C135
1.53V
1.46V
R136
R137
C140
11.5V
12V
BLK
Q202
R225
C132
12.7V
R141
R142
13.6V
11.7V
R207
R208
R224
12V
R211
R214
C209
R144
R237
TP
VCO ADJ
R217
C211
C206
R206
C205
YEL
R205
C204
C225
C203
R202
C202
D203
BRN
R223
C208 C207
9.9V
7.3V
R212
Q201
R209 R215
R213
R218
R210 R216
R220
C212
R221 R219
R222 C215 C213
C216 C214
R109
T106
C107
C128
R123
R117
C119
R119
R132
D108
D112 D111
SIGNAL
BLU
R125
C137
Q102
R145
C118
R113
T105
R112
C112
Q103
C138
R129
Q104
T104
C114
C113
C115
R130
R909
R908
0V
R111
0.01V
R128
R131
R127
R910
R120
D104
R121
Q105
R201
0V
R140
0.67V
C201
C139
D105
A.T
D204
C218 C219
D202
MUT
Q203
R234
R233
R236
C222
C224
R235
D201
C210
C213
R OUT
L OUT
J901
AS
C918
BLK
R227
R226
R231
Z202
R229
R230
Z201
R228
E
+B
to Synthesizer P.C Board
0.6V
0.5V
9.2V
0 V
41
82
F M 0 V
LW/SW 4.8 V
M W 1.3 V
GRY
POWER P.C BOARD
Power Cord
BRN
0
240V
BLU
220V
R914
R913
F901
1AT
(England Only)
(Europe Only)
R916
R915
GRY
BRN
0V
T901
Power Transfomer
RED
240V
BRN
0V
YEL
BRN
BLK
E
76
to Synthesizer P.C Board
S901
BRN
BRN
C922
D901
C902
C903
C904
C901
F902
1.6AT
D902
C906
C907
C908
C905
F903
1.6AT
D906
ORG
83
D904
C915
C912
C914
C917
13.5V
R905 R906
D907
5.2V
Q902
5.7V
R907
C909
32V
Q901
R901
C910
D905
D908
15V
15.5V
D903
R902
C913
32V
Q903
28V
C911
FM SW MW LW
BACK UP
AC
E
8.2V
5V
72
71
RED
81
51 52 53 54
75 74 73
to Synthesizer P.C Board
to Syntheizer P.C Board

1	1.1V
2	3.2V
3	1.1V
4	4.7V
5	0 V
6	1.27V
7	0 V
8	0 V
9	0 V

Pin	1	2	3	4	5	6	7	8
F M	12.7V	8.0V	8.7V	9.3V	9.3V	11.5V	0 V	3.8V
Others	12 V	7.5V	8.2V	8.7V	8.7V	12 V	0 V	0 V
Pin	16	15	14	13	12	11	10	9
F M	11.2V	11.1V	4.4V	4.0V	3.4V	3.4V	4.0V	4.4V
Others	1.45V	5.5V	4.2V	3.8V	3.2V	3.2V	3.8V	4.2V

Figure 24.

SCHEMATIC DIAGRAM (TUNER & POWER SUPPLY SECTION)


TUNER
FM FRONT END
3SK59 or 3SK45
ISV55
2SC1923 or 2SC535
2SC710 or 2SC1923
2SK61
J001
FM 300Ω
FM 75Ω
E
EXT AM ANT
FM OSC
AM OSC
to Synthesizer
Q101 2SC1923-O
Z101 Z102
Z103 SFE10.7MLR
T104
T106 2.2μH
Q107 HA11211
Q102 Q103 2SC1815 GRx2
Q104 Q105 2SC1815 GRx2
Q106 2SC1815-GR
T101 T102 T103
Z104 SFZ 450F
AM 3BAND TUNER
Bar Ant
LW MW SW
2SC1815
2SC941
SMV1380
S505 S506 S507 S508 S509
Q202 2SA561-Y
Q201 TA 7624P
Q203 TA7324P
VCO ADJ
T.P
LPF
Z201 Z202
J901
R OUT
L OUT
A.S
AT
VD ø
POWER SUPPLY
Q901 2SD234-Y
Q903 TA78L012P
Q902 2SD234-Y
D901 WL02
D902 WL02
D903 02Z15A
D904 02Z5.6A
D905 05Z8.2U
D906 IS2462
D907 02Z8.2A
D908 IS1555
D109 D110 IS1555x2
D111 D112 IS1555x2
T901
F901 1AT
F902 1.6AT
F903 1.6AT
S901
AC 220/240V 50 Hz
VD
Vd
VH
E
AC
LW MW SW FM AM/FM BACK UP +B
82 83 41 42 81 76 77 78 71 72 73 74 79 54 53 52 51 55 75 91 92
FM/Vd/Right
FM Auto Stop
MW/Left
AM Auto Stop

Q107

Pin	1	2	3	4	5	6	7	8	9
FM	3.6V	0V	2.4V	0.67V	0V	1.8V	1.8V	1.8V	0V
others	2.8V	0V	3.0V	0.67V	0V	2.1V	2.8V	2.1V	0V
Pin	18	17	16	15	14	13	12	11	10
FM	0V	0V	3.6V	5.2V	5.5V	5.5V	5.5V	12.7V	5.1V
others	0V	0V	4.2V	7.1V	5.5V	5.5V	5.5V	12.9V	5.2V

FM	0V
LW/SW	4.8V
MW	1.3V

SW	0V
FM, MW, LW	4.9V

LW	0V
FM, SW, MW	4.9V

FM	0V
SW, MW, LW	4.8V

VD

FM	2.8V~22.2V
SW	12V~20.3V
MW	1V~22.2V
LW	1.5V~18V

Q201

Pin	1	2	3	4	5	6	7	8
FM	12.7V	8.0V	8.7V	9.3V	9.3V	11.5V	0V	3.8V
others	12V	7.5V	8.2V	8.7V	8.7V	12V	0V	0V
Pin	16	15	14	13	12	11	10	9
FM	11.2V	11.1V	4.4V	4.0V	3.4V	3.4V	4.0V	4.4V
others	1.45V	5.5V	4.2V	3.8V	3.2V	3.2V	3.8V	4.2V

Position

S505 : LW Switch ------ OFF
S506 : MW Switch ------ OFF
S507 : SW Switch ------ OFF
S508 : FM Switch ------ OFF
S509 : Mode Switch ------ STEREO
S901 : Power Switch ------ OFF

Figure 25.

DISPLAY & SYNTHESIZER P.C. BOARD (BOTTOM VIEW)

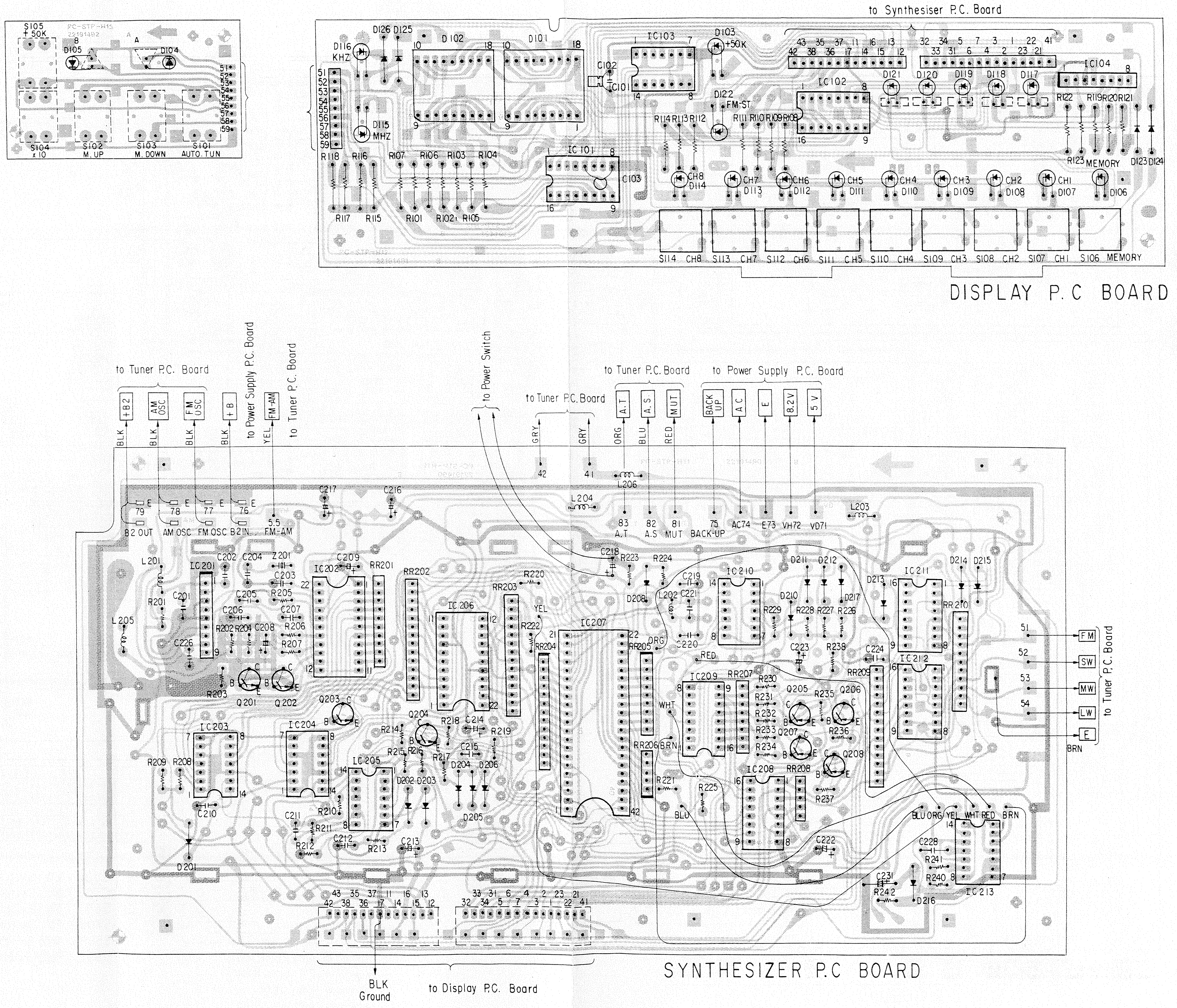

S105
+50K
D105
D104
S104
x10
S102
M. UP
S103
M. DOWN
S101
AUTO. TUN
to Synthesiser P.C. Board
D116
KHZ
D126
D125
D102
D101
IC103
D103
+50K
C102
IC101
D115
MHZ
D122
FM·ST
IC102
IC104
D121
D120
D119
D118
D117
R122
R119
R120
R121
R123
MEMORY
D123
D124
R118
R116
R107
R106
R103
R104
IC101
C103
R114
R113
R112
R111
R110
R109
R108
CH8
D114
CH7
D113
CH6
D112
CH5
D111
CH4
D110
CH3
D109
CH2
D108
CH1
D107
D106
R117
R115
R101
R102
R105
S114
CH8
S113
CH7
S112
CH6
S111
CH5
S110
CH4
S109
CH3
S108
CH2
S107
CH1
S106
MEMORY
DISPLAY P.C BOARD
to Tuner P.C. Board
+B2
AM OSC
FM OSC
+B
FM-AM
BLK
YEL
to Power Supply P.C. Board
to Tuner P.C. Board
to Power Switch
to Tuner P.C. Board
GRY
A.T
A.S
MUT
ORG
BLU
RED
to Power Supply P.C. Board
BACK UP
A.C
E
8.2V
5V
B2 OUT
AM OSC
FM OSC
B2 IN
FM-AM
A.T
A.S
MUT
BACK-UP
AC74
E73
VH72
VD71
L201
L203
L204
L205
L206
IC201
IC202
IC203
IC204
IC205
IC206
IC207
IC208
IC209
IC210
IC211
IC212
IC213
Q201
Q202
Q203
Q204
Q205
Q206
Q207
Q208
RR201
RR202
RR203
RR204
RR205
RR206
RR207
RR208
RR209
RR210
D201
D202
D203
D204
D205
D206
D208
D210
D211
D212
D213
D214
D215
D216
D217
FM
SW
MW
LW
E
BRN
to Tuner P.C. Board
WHT
BLU
ORG
YEL
RED
BLK
Ground
to Display P.C. Board
SYNTHESIZER P.C BOARD

Figure 26.

SCHEMATIC DIAGRAM (DISPLAY & SYNTHESIZER SECTION)

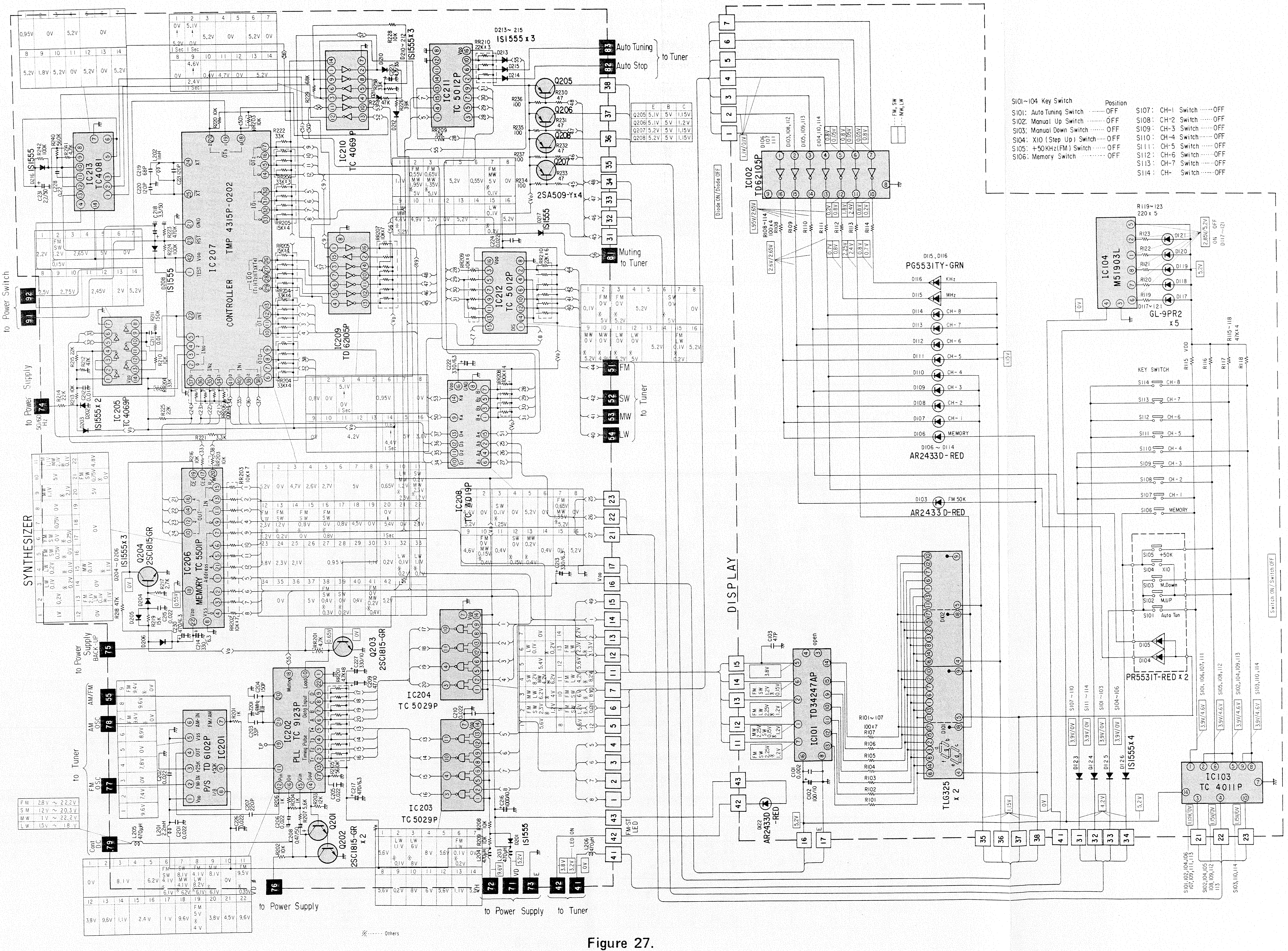

S101~104 Key Switch
Position
S101: Auto Tuning Switch ········OFF
S102: Manual Up Switch ········OFF
S103: Manual Down Switch ······OFF
S104: X10 (Step Up) Switch·····OFF
S105: +50KHz(FM) Switch ·····OFF
S106: Memory Switch ········OFF
S107: CH-1 Switch ······OFF
S108: CH-2 Switch ······OFF
S109: CH-3 Switch ······OFF
S110: CH-4 Switch······OFF
S111: CH-5 Switch ······OFF
S112: CH-6 Switch······OFF
S113: CH-7 Switch ······OFF
S114: CH- Switch·····OFF
SYNTHESIZER
DISPLAY
to Power Switch
to Power Supply
to Power Supply BACK-UP
to Tuner
Auto Tuning
Auto Stop
Muting to Tuner
FM
SW
MW
LW
IC207 TMP 4315P-0202 CONTROLLER
IC206 MEMORY TC 5501P
IC202 PLL TC 9123P
IC201 P/S TD 6102P
IC203 TC 5029P
IC204 TC 5029P
IC205 TC 4069P
IC208 TC 4019P
IC209 TD 6205P
IC210 TC 4069P
IC211 TC 5012P
IC212 TC 5012P
IC213 TC 4081
IC101 TD34247AP
IC102 TD62105P
IC103 TC 4011P
IC104 M51903L
Q201 Q202 2SC1815-GR x 2
Q203 2SC1815-GR
Q204 2SC1815GR
Q205~Q208 2SA509-Y x 4
D213~215 1S1555 x 3
D115, D116 PG5531TY-GRN
D106 ~ D114 AR2433D-RED
D103 AR2433 D-RED
D117~121 GL-9PR2 x 5
D104, D105 PR5531T-RED x 2
D123~D126 1S1555 x 4
D122 AR2433D -RED
TLG325 x 2
KEY SWITCH
R119~123 220 x 5
※······ Others

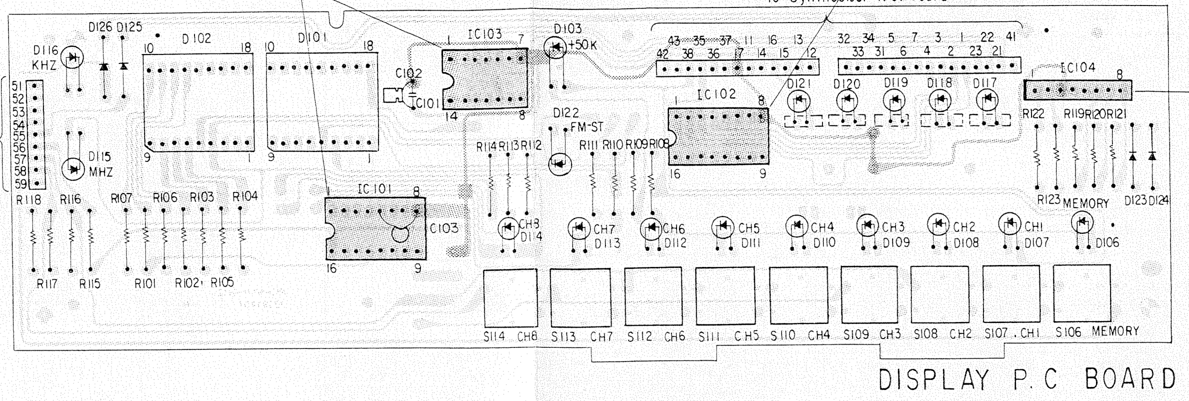
Figure 27.

DISPLAY & SYNTHESIZER P.C. BOARD (VOLTAGES OF MEASURING POINTS)

1	2	3	4	5	6	7	8
MW 2.25V SW 0.15V ☆ 1.2V	FM LW 2.25V ☆ 1.2V	—	—	3.8V	FM SW 1.2 V ☆ 0.15V	FM SW 2.25V ☆ 1.2V	0 V
9	10	11	12	13	14	15	16
—	—	—	—	—	—	—	5.2V

1	2	3	4	5	6	7
S101, 106 107, 111 3.9V/4.6V	S102,104 109, 113 3.9V/4.6V	S101,102 104,106 107,109 111,113 1.15V/0V	S102, 104 105, 108 109, 112 113 1.15V/0V	S102,104 109,113 3.9V/4.6V	S105,108 112 3.9V/4.6V	0 V
8	9	10	11	12	13	14
S103, 110, 114 3.9V/4.6V		S103,110 114 1.15V/0V	—	—	—	5.2 V

1	2	3	4	5	6	7	8
D106,107 111 1.1V/0.1V	D103,108 112 1.1V/0.1V	D105,109 113 1.1V/0.1V	D104,110 114 1.1V/0.1V	FM, SW 0.8V ☆ 0.05V		FM SW 0.05V ☆ 0.8V	0 V
9	10	11	12	13	14	15	16
—	FM SW 0.8V ☆ 0.2 V	FM SW 1.8V ☆ 2.4V	FM SW 0.2V ☆ 0.8V	D104,110 114 1.95V/2.65V	D105,109 113 1.95V/2.65V	D103,108 112 1.95V/2.65V	D106,107 111 1.95V/2.65V

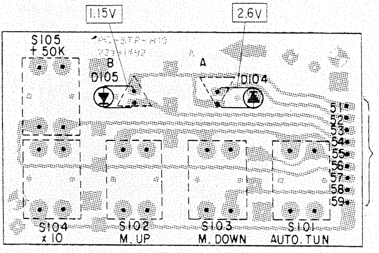

to Synthesiser P.C. Board
D116 KHZ
D126 D125
D102
D101
IC103
D103 +50K
C102
C101
IC102
IC104
IC101
C103
D115 MHZ
D122 FM-ST
D121 D120 D119 D118 D117
CH1 CH2 CH3 CH4 CH5 CH6 CH7 CH8
D106 D107 D108 D109 D110 D111 D112 D113 D114
MEMORY
D123 D124
S114 CH8 S113 CH7 S112 CH6 S111 CH5 S110 CH4 S109 CH3 S108 CH2 S107 CH1 S106 MEMORY
DISPLAY P.C BOARD

1	D117 ~ 121 2.85V/5.2V
2	
3	0 V
4	0 V
5	5.2V
6	D117~121 2.85V/5.2V
7	
8	

Diode ON / Diode OFF

Switch ON / Switch OFF

☆----- Others


1.15V
2.6V
S105 +50K
D105
D104
51 52 53 54 55 56 57 58 59
S104 x10
S102 M.UP
S103 M.DOWN
S101 AUTO TUN

1	2	3	4	5	6	7	8	9	10	11
0 V	8.1 V			6.2V	FM SW 4.1V ☆ 6.1 V	SW 8.1V MW 4.1V ☆ 6.2V	FM 4.1V LW 8.2V ☆ 6.1V	MW 8.1V ☆ 6.1V	0 V	FM 9.5V ☆ 0.35V
12	13	14	15	16	17	18	19	20	21	22
3.8V	9.6V	1.1 V	2.4 V		1 V	9.6V	FM 5 V ☆ 4 V	3.8V	4.5 V	9.6V

1	2	3	4	5	6	7	8	9	10	11
1 V	0.2 V	LW 0.1V ☆ 0.2V	LW 0.2V ☆ 0.1V	FM SW 0.75V ☆ 0 V	FM SW 0 V ☆ 0.75V	0.75V	0 V	MW 1.1V ☆ 2.1V	5 V	FM 1.1V MW 2.1V ☆ 0.1V
12	13	14	15	16	17	18	19	20	21	22
0V	FM 2.1V LW 0.1V ☆ 1.1V	0 V	MW 0.1V ☆ 1.1V	0 V				5V	FM SW 0.75V ☆ 0 V	4.8V

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
5.2V	0 V	4.7V	2.6 V	2.7 V	5 V			0.65V	LW MW 1.2V ☆ 2.3V	SW 0.2V MW 2.3V ☆ 1.2 V	FM LW 2.3V ☆ 1.2V	FM SW 1.2V ☆ 0.2V	FM, SW 0.8V ☆ 0V		FM SW 0 V ☆ 0.8V	0.8V	4.5 V	0V	0V ↑ 5.4V 1 Sec	0 V
22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
2.6V	3.8V	2.3V	2.1V	0.95V				1.1 V	0.2 V	LW 0.1V ☆ 0.2V	LW 1.1V ☆ 0.1V	0 V			5 V	FM SW 0.4V ☆ 0.3 V	SW 0V ☆ 0.2V	0.4V	FM 0 V MW 0.2V ☆ 0.4V	5.2V

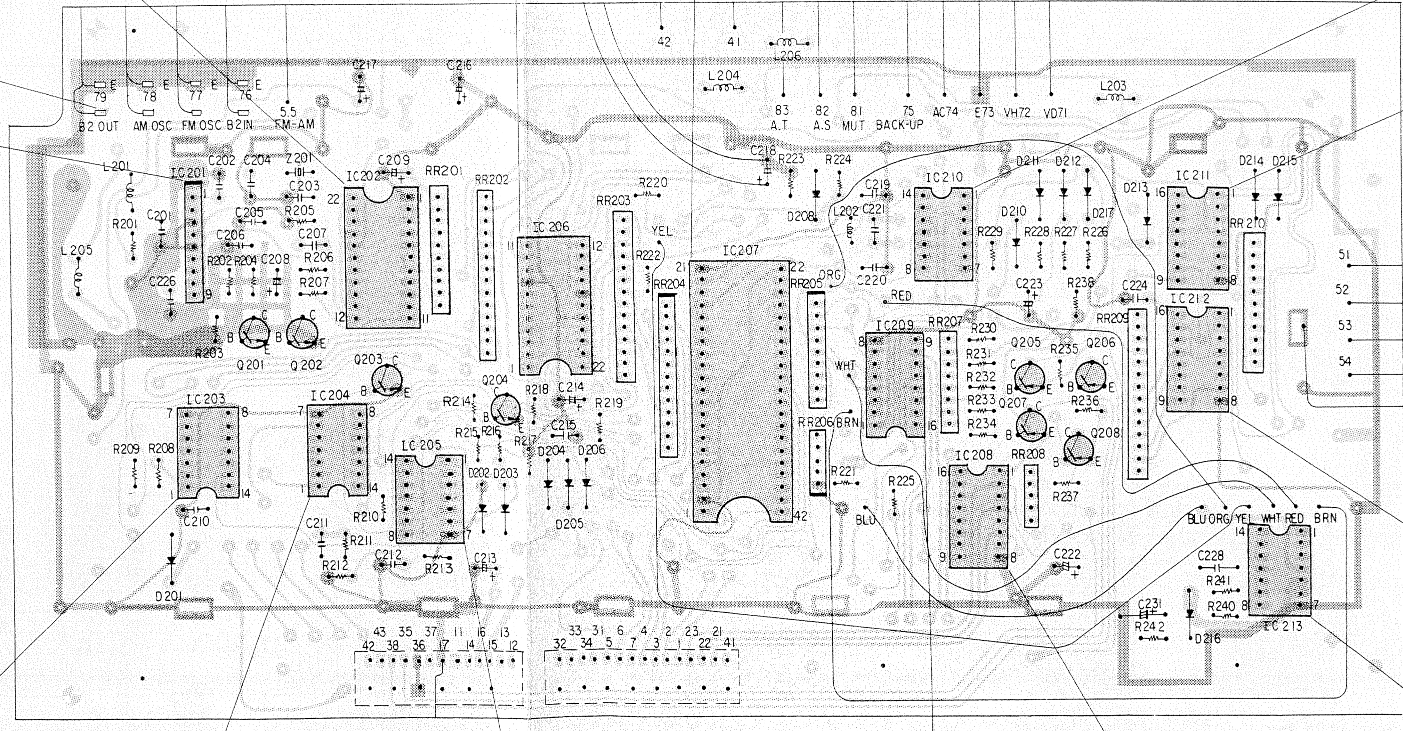
1	2	3	4	5	6	7
0 V ↑ 5.2V 1 Sec	5.1V ↑ 0 V 1 Sec	5.2V	0 V		5.2V	0 V
8	9	10	11	12	13	14
0 V	4.6V ↑ 2.4V 1 Sec	0.4V	4.7V	0V	5.2V	

※·VD

FM	2.8V ~ 22.2V
SW	12V ~ 20.3V
MW	1V ~ 22.2V
LW	1.5V ~ 18 V

1	2	3	4	5	6	7	8	9
9.6V	7.4V	0 V	7.8V	0 V	8.9 V	FM 9.4V ☆ 0 V	9.6V	FM 9.4 V ☆ 0 V

	E	B	C
Q 201	0.6V	1.1 V	※·VD
Q 202	0 V	0.6V	※·VD
Q 203	0 V	0 V	0.65 V
Q 204	0 V		0 V


79 78 77 76 55
82 OUT
AM OSC
FM OSC
B2 IN
FM-AM
C217
C216
42
41
L206
L204
83 A.T
82 A.S
81 MUT
75 BACK-UP
AC74
E73
VH72
VD71
L203
IC201
IC202
IC203
IC204
IC205
IC206
IC207
IC208
IC209
IC210
IC211
IC212
IC213
Q201 Q202 Q203 Q204 Q205 Q206 Q207 Q208
L201
L205
D201
D205
D216
YEL
RED
WHT
BLU
BLU ORG YEL WHT RED BRN
51 52 53 54
43 35 37 11 16 13
42 38 36 17 14 15 12
33 31 6 4 2 23 21
32 34 5 7 3 1 22 41

1	2	3	4	5	6	7	8
1.1V	FM 0.55V MW 1.95V ☆ 5 V	FM 0.65V MW 1.35V ☆ 5.1V	5.2V		0.55V	FW MW 5 V ☆ 0.1 V	0V
9	10	11	12	13	14	15	16
LW MW 4.4V ☆ 5.2V	4.9V	5.1V	0V	5.2V	—	LW 0.1V ☆ 0.2V	5.2 V

	E	B	C
Q205	5.1 V	5 V	1.15 V
Q206	5.1 V	5 V	1.2 V
Q207	5.2V	5 V	1.15 V
Q208	5.2V	5 V	1.15 V

1	2	3	4	5	6	7	8
0.1 V	FM 0V ☆ 5 V	FM 0V ☆ 5.2V	5.2 V		SW 0V ☆ 5V		0 V
9	10	11	12	13	14	15	16
MW 0V ☆ 5.2V	MW 0V ☆ 4.9V	LW 0V ☆ 5.2V	LW 0V ☆ 5 V	5.2 V		FM LW 0.1V ☆ 0.2 V	5.2V

1	2	3	4	5	6	7
0.95V	0 V		5.2V	0 V		
8	9	10	11	12	13	14
5.2 V	1.8 V	5.2V	0 V	5.2V	0 V	5.2V

☆---- Others

1	2	3	4	5	6	7
5.6 V	LW 1.1V ☆ 0.1V	LW 6 V ☆ 8 V	8V	5.6V	FM LW 0.1V ☆ 0.2V	0V
8	9	10	11	12	13	14
5.6V	0.2V	8 V	6 V	5.6V	1.1V	5.2 V

1	2	3	4	5	6	7
5.6V	FM SW 2.3V ☆ 1.2V	MW LW 6.2V ☆ 4 V	SW 8.2V MW 4.2V ☆ 6.2V	5.4 V	LW 0.1V ☆ 0.2V	0 V
8	9	10	11	12	13	14
5.6 V	FM SW 1.2V ☆ 0.2V	FM SW 6V ☆ 8 V	FM LW 4.2V ☆ 8.2V	5.6V	FM LW 2.3V ☆ 1.3V	5.2V

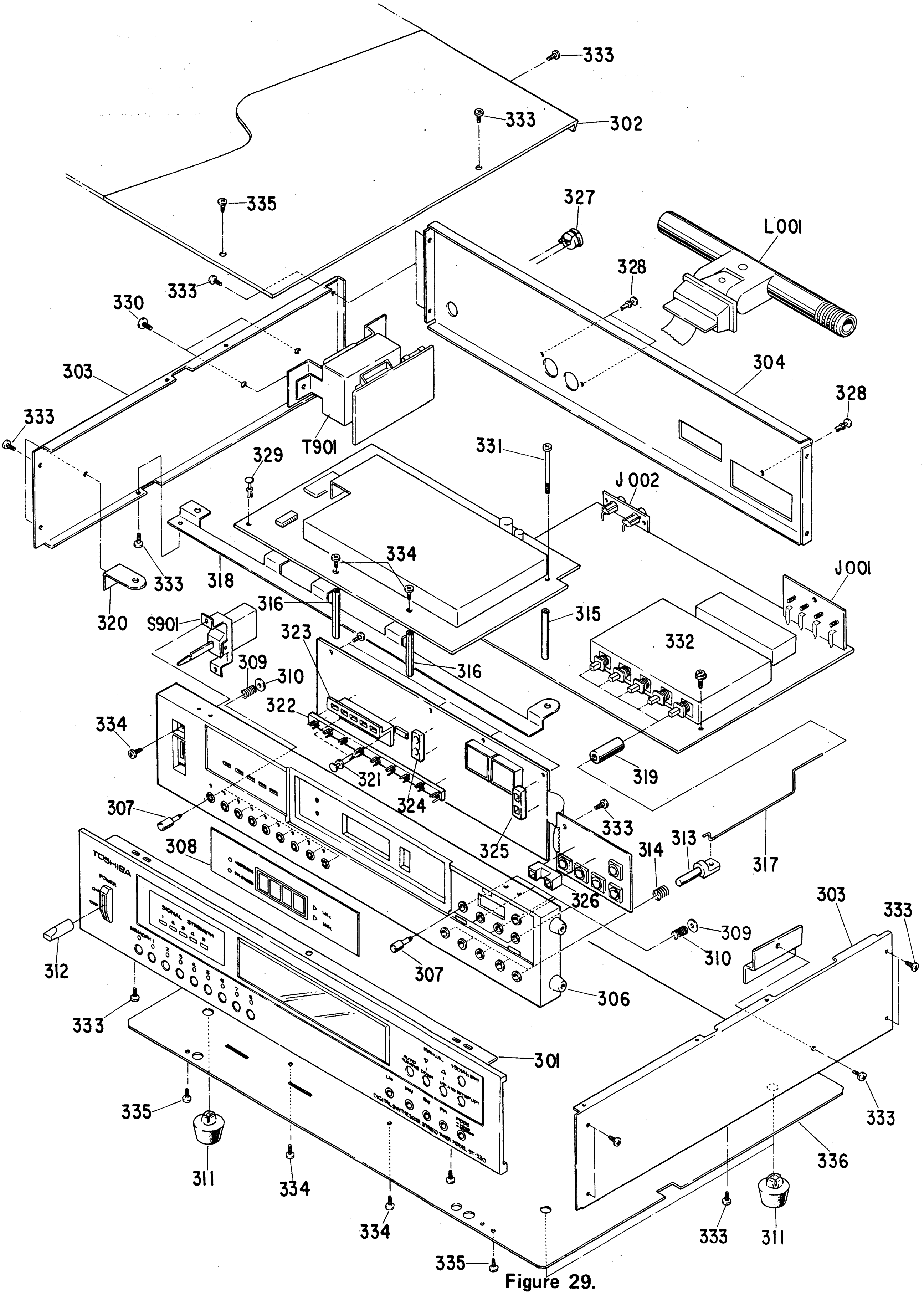
1	2	3	4	5	6	7
2.2V	FM SW 1.2V ☆ 0.15V	2.65V		5 V	0 V	
8	9	10	11	12	13	14
2.5V	2.75 V		2.45 V		2 V	5.2V

1	2	3	4	5	6	7	8
0.8V	0 V	5.1 V ↑ 0 V 1 Sec	0.95V				0 V
9	10	11	12	13	14	15	16
0 V	4.2 V				0.6V ↑ 4.4 V 1 Sec	5 V	3.8 V

1	2	3	4	5	6	7	8
LW MW 4.4V ☆ 5.2V	0 V	SW 0.1V ☆ 1.25V	0 V	5.2V	0 V	FM 0.65V MW 1.35V ☆ 5.2 V	0 V
9	10	11	12	13	14	15	16
4.6V	FM 0 V MW 0.15V ☆ 0.4V	0.4V	SW 0 V ☆ 0.15V	MW 0.2 V ☆ 0.4V	0.4V	0 V	5.2 V

Figure 28.

10. CABINET EXPLODED VIEW


333
333
302
335
327
L001
328
333
330
303
304
328
333
T901
329
331
J002
334
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318
J001
320
S901
316
315
332
323
316
309
310
322
334
321
324
319
307
333
308
325
314
313
317
326
303
309
333
312
TOSHIBA
310
307
306
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301
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311
335

Figure 29.

SCHEMATIC DIAGRAM (OVERALL)

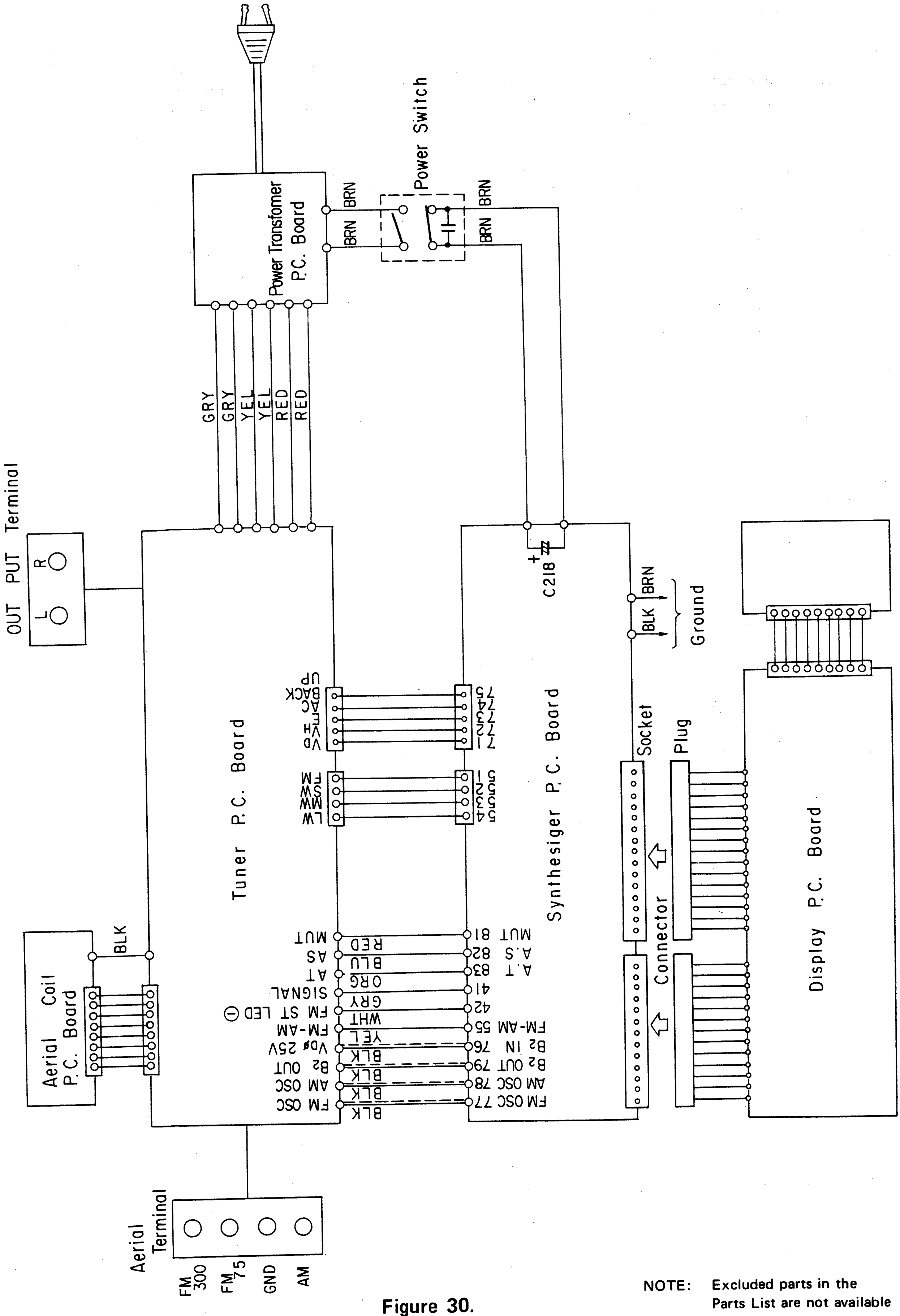

Power Transfomer P.C. Board
Power Switch
BRN
BRN
BRN
BRN
GRY
GRY
YEL
YEL
RED
RED
OUT PUT Terminal
L
R
C218
Ground
BRN
BLK
Tuner P.C. Board
Synthesiger P.C. Board
Display P.C. Board
Socket
Plug
Connector
UP
BACK
AC
F
H
VD
FM
SW
MW
LW
75
74
73
72
71
51
52
53
54
MUT
AS
AT
SIGNAL
FM ST LED ①
FM-AM
VDø 25V
B2 OUT
AM OSC
FM OSC
RED
BLU
ORG
GRY
WHT
YEL
BLK
BLK
BLK
BLK
MUT 81
A.S 82
A.T 83
41
42
FM-AM 55
B2 IN 76
B2 OUT 79
AM OSC 78
FM OSC 77
Aerial Coil P.C. Board
BLK
Aerial Terminal
FM 300
FM 75
GND
AM

Figure 30.

NOTE: Excluded parts in the Parts List are not available as replacement parts.

11. PARTS LIST

Symbol No.	Part No.	Description
TRANSISTORS, IC'S & DIODES		
TUNER AND POWER SUPPLY		
Q101		Transistor, 2SC1923-O
Q102, 103		Transistor, 2SC1815-GR
Q104, 105		Transistor, 2SC1815-GR
Q106		Transistor, 2SC1815-GR
Q107	22114626	IC, HA11211
Q201		IC, TA7624P
Q202		Transistor, 2SA561-Y
Q203		IC, TA7324AP
Q901, 902		Transistor, 2SD234-Y
Q903		IC, TA78L012P
D101, 102		Diode, 1S1555V
D103, 104		Diode, 1N60-FD1
D105, 106		Diode, 1N60-FD1
D107		Diode, 1N60-FD1
D108, 109		Diode, 1S1555V
D110, 111		Diode, 1S1555V
D112		Diode, 1S1555V
D201, 202		Diode, 1S1555V
D203, 204		Diode, 1S1555V
D901, 902	22115485	Diode, WL02M
D903		Diode, 02Z15A
D904		Diode, 02Z5.6A
D905		Diode, 05Z8.2U
D906		Diode, 1S2462
D907		Diode, 02Z8.2A
D908		Diode, 1S1555V
DISPLAY AND SYNTHESIZER SECTION		
IC101		IC, TD34247AP
IC102		IC, TD62105P
IC103		IC, TC4011BP
IC104	22114634	IC, M51903L
D101, 102		Diode, TLG325
D103	22115499	Diode, AR2433D-RED
D104, 105	22115500	Diode, PR5531T-RED
D106, 107, 108, 109, 110, 111, 112, 113, 114	22115499	Diode, AR2433D-RED
D115, 116	22115501	Diode, PR5531T-GRN
D117, 118, 119, 120, 121	22115469	Diode, GL-9PR2
D122	22115499	Diode, AR2433D-RED
D123, 124, 125, 126		Diode, 1S1555V
IC201		IC, TD6102P
IC202		IC, TC9123P
IC203, 204		IC, TC5029BP
IC205		IC, TC4069UBP
IC206		IC, TC5501P
IC207	22114773	IC, TMP4315P-0202
IC208		IC, TC4019BP
IC209		IC, TD62105P
IC210		IC, TC4069UBP
IC211, 212		IC, TC5012P
IC213		IC, TC4081P
Q201, 202		Transistor, 2SC1815-GR
Q203, 204		Transistor, 2SC1815-GR
Q205, 206		Transistor, 2SA509-Y
Q207, 208		Transistor, 2SA509-Y
D201, 202		Diode, 1S1555V
D203, 204		Diode, 1S1555V
D205, 206		Diode, 1S1555V
D208, 210		Diode, 1S1555V
D211, 212		Diode, 1S1555V
D213, 214		Diode, 1S1555V
D215, 216		Diode, 1S1555V
D217		Diode, 1S1555V
TRANSFORMERS & COILS		
L001	22242736	Coil, Aerial
L201, 203	22291082	Coil, Choke, 2.2μH
L202	22232204	Coil, Choke, 1mH
L204, 205, 206	22230106	Coil, Choke, 470mH
T101	22264757	Transformer, IF, AM
T102	22266326	Transformer, IF, AM
T103	22264626	Transformer, IF, AM
T104	22267349	Transformer, IF, FM
T105	22241050	Coil, Choke, 18μH
T106	22291082	Coil, Choke, 2.2μH
T107	22232219	Coil, Choke, 0.885mH
T901	22223635	Transformer, Power
ELECTRICAL PARTS		
S101	22195145	Switch, Key, Auto Tuning
S102		Switch, Key, Manual UP
S103		Switch, Key, Manual Down
S104		Switch, Key, x 10
S105		Switch, Key, +50K
S106		Switch, Key, Memory
S107		Switch, Key, CH-1
S108		Switch, Key, CH-2
S109		Switch, Key, CH-3
S110		Switch, Key, CH-4
S111		Switch, Key, CH-5
S112		Switch, Key, CH-6
S113		Switch, Key, CH-7
S114		Switch, Key, CH-8
S505	22195369	Switch, Push, LW
S506		Switch, Push, MW
S507		Switch, Push, SW
S508		Switch, Push, FM
S509		Switch, Push, Mode
S901	22195213	Switch, Lever, Power
Z001	22131351	FM Front End
Z002	22131352	AM 3 Band Tuner
Z101, 102, 103	22153107	Filter, Ceramic, FM
Z104	22153106	Filter, Ceramic, AM
Z201	22153069	Crystal, 6.4 MHz
Z202, 203	22135025	Filter, Low Pass
J001	22162437	Terminal, 4P, Aerial
J002	22163692	Terminal, 2P, Output
F901	22144337	Fuse, 1AT
F902, 903	22144293	Fuse, 1.6AT
	22165047	Holder, Fuse
E1	22176286	Cord, Power (TE)
E1	22176536	Cord, Power (TU)
CAPACITORS **J = ±5%, K = ±10%, Z = –20+80%**		
TUNER AND POWER SUPPLY		
C01	22342223	Ceramic, 0.022mfd, 50V, Z
C02	22342223	Ceramic, 0.022mfd, 50V, Z
C03	22342223	Ceramic, 0.022mfd, 50V, Z
C001	22349151	Ceramic, 150pF, 50V, K
C101	22342223	Ceramic, 0.022mfd, 50V, Z
C102	22342223	Ceramic, 0.022mfd, 50V, Z
C103	22342223	Ceramic, 0.022mfd, 50V, Z
C104	22342223	Ceramic, 0.022mfd, 50V, Z
C105	22342473	Ceramic, 0.047mfd, 50V, Z
C106	22342473	Ceramic, 0.047mfd, 50V, Z
C107	22342473	Ceramic, 0.047mfd, 50V, Z
C108	22342223	Ceramic, 0.022mfd, 50V, Z
C109	22342223	Ceramic, 0.022mfd, 50V, Z
C110	22349101	Ceramic, 100pF, 50V, K
C111	22362560	Ceramic, 56pF, 50V, K
C112	22445470	Electrolytic, 47mfd, 16V
C113	22342473	Ceramic, 0.047mfd, 50V, Z
C114	22448478	Electrolytic, 0.47mfd, 50V
C115	22349331	Ceramic, 330pF, 50V, K
C116	22362221	Ceramic, 220pF, 50V, K
C117	22349331	Ceramic, 330pF, 50V, K
C118	22448109	Electrolytic, 1mfd, 50V
C119	22342223	Ceramic, 0.022mfd, 50V, Z
C120	22448339	Electrolytic, 3.3mfd, 50V
C121	22448339	Electrolytic, 3.3mfd, 50V
C122	22448109	Electrolytic, 1mfd, 50V
C123	22448339	Electrolytic, 3.3mfd, 50V
C124	22371103	Mylar, 0.01mfd, 50V, J
C125	22371103	Mylar, 0.01mfd, 50V, J
C126	22371103	Mylar, 0.01mfd, 50V, J
C127	22448109	Electrolytic, 1mfd, 50V
C128	22342473	Ceramic, 0.047mfd, 50V, Z
C130	22349101	Ceramic, 100pF, 50V, K
C131	22362820	Ceramic, 82pF, 50V, K
C133	22371103	Mylar, 0.01mfd, 50V, J
C134	22371103	Mylar, 0.01mfd, 50V, J
C135	22445100	Electrolytic, 10mfd, 16V
C136	22371103	Mylar, 0.01mfd, 50V, J
C137	22448478	Electrolytic, 0.47mfd, 50V
C138	22447479	Electrolytic, 4.7mfd, 35V
C139	22342223	Ceramic, 0.022mfd, 50V, Z
C140	22362390	Ceramic, 39pF, 50V, K
C201	22445221	Electrolytic, 220mfd, 16V
C202	22448109	Electrolytic, 1mfd, 50V
C203	22371472	Mylar, 0.0047mfd, 50V, J
C204	22371273	Mylar, 0.027mfd, 50V, J
C205	22371273	Mylar, 0.027mfd, 50V, J
C206	22445100	Electrolytic, 10mfd, 16V
C207	22445100	Electrolytic, 10mfd, 16V
C208	22445100	Electrolytic, 10mfd, 16V
C209	22445470	Electrolytic, 47mfd, 16V
C210	22445100	Electrolytic, 10mfd, 16V
C211	22445470	Electrolytic, 47mfd, 16V
C212	22445100	Electrolytic, 10mfd, 16V
C213	22447479	Electrolytic, 4.7mfd, 35V
C214	22371103	Mylar, 0.01mfd, 50V, J
C215	22321053	Polypropylene, 470pF, 50V, J
C216	22371333	Mylar, 0.033mfd, 50V, J
C218	22342473	Ceramic, 0.047mfd, 50V, Z
C219	22371472	Mylar, 0.0047mfd, 50V, J
C222	22447479	Electrolytic, 4.7mfd, 35V
C224	22448109	Electrolytic, 1mfd, 50V
C225	22447479	Electrolytic, 4.7mfd, 35V
C901	22342223	Ceramic, 0.022mfd, 50V, Z
C902	22342223	Ceramic, 0.022mfd, 50V, Z
C903	22342223	Ceramic, 0.022mfd, 50V, Z
C904	22342223	Ceramic, 0.022mfd, 50V, Z
C905	22342223	Ceramic, 0.022mfd, 50V, Z
C906	22342223	Ceramic, 0.022mfd, 50V, Z
C907	22342223	Ceramic, 0.022mfd, 50V, Z
C908	22342223	Ceramic, 0.022mfd, 50V, Z
C909	22460031	Electrolytic, 1000mfd, 35V
C910	22447221	Electrolytic, 220mfd, 35V
C911	22445221	Electrolytic, 220mfd, 16V
C913	22447471	Electrolytic, 470mfd, 35V
C914	22445102	Electrolytic, 1000mfd, 16V
C915	22443221	Electrolytic, 220mfd, 10V
C917	22443221	Electrolytic, 220mfd, 10V
C918	22445221	Electrolytic, 220mfd, 16V
C919	22342223	Ceramic, 0.022mfd, 50V, Z
C920	22342223	Ceramic, 0.022mfd, 50V, Z
C921	22443102	Electrolytic, 1000mfd, 10V
C922	22340108	Ceramic, 4700pF, 400V, S

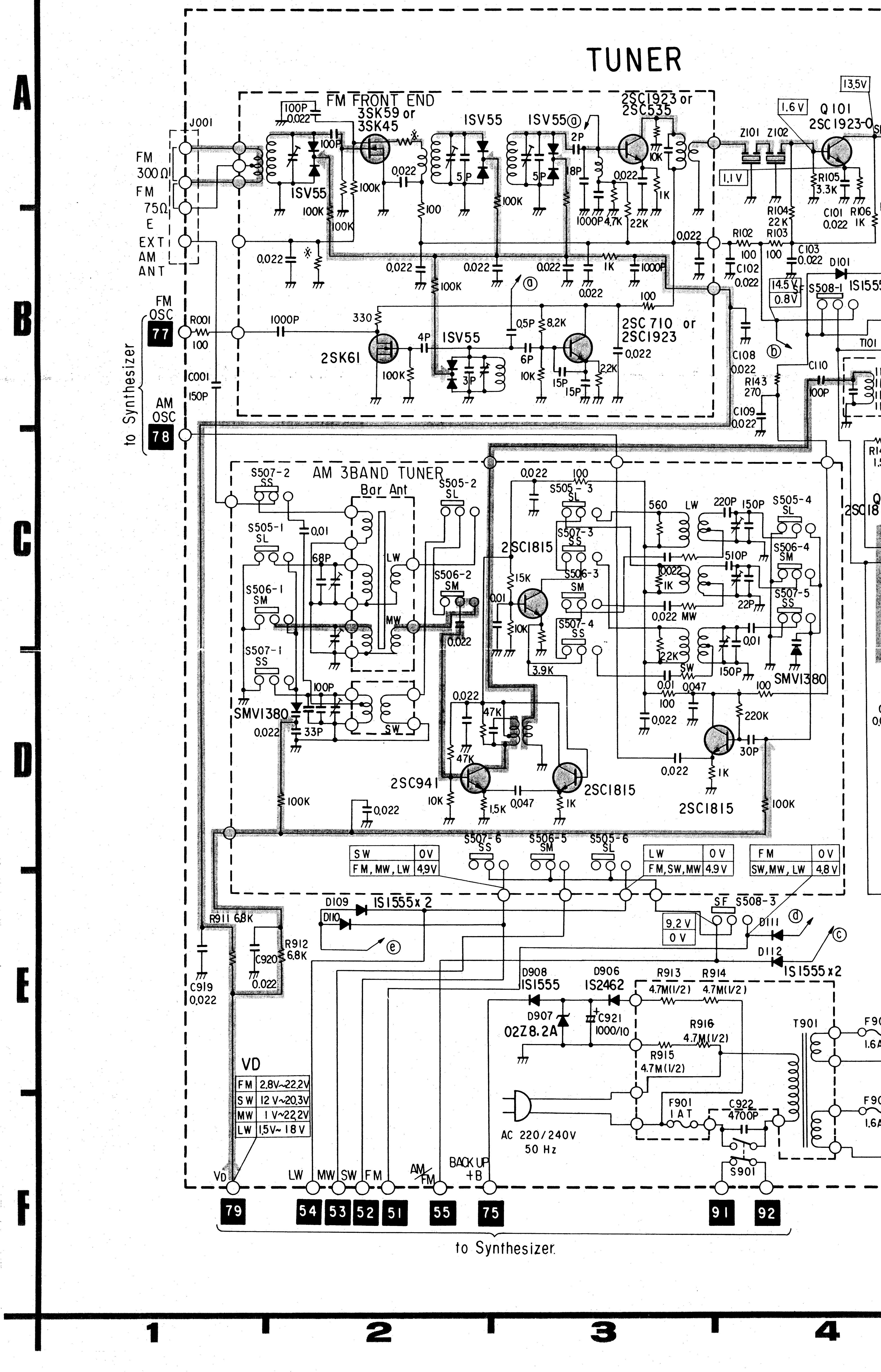
Symbol No.	Part No.	Description
DISPLAY AND SYNTHESIZER SECTION		
C101	22443101	Electrolytic, 100mfd, 10V
C102	22342223	Ceramic, 0.022mfd, 50V, Z
C103	22362470	Ceramic, 47pF, 50V, J
C201	22342223	Ceramic, 0.022mfd, 50V, Z
C202	22342223	Ceramic, 0.022mfd, 50V, Z
C203	22361330	Ceramic, 33pF, 50V, J
C204	22349151	Ceramic, 150pF, 50V, K
C205	22342223	Ceramic, 0.022mfd, 50V, Z
C206	22342223	Ceramic, 0.022mfd, 50V, Z
C207	22349221	Ceramic, 220pF, 50V, K
C208	22448478	Electrolytic, 0.47mfd, 50V
C209	22443470	Electrolytic, 47mfd, 10V
C210	22342223	Ceramic, 0.022mfd, 50V, Z
C211	22371103	Mylar, 0.01mfd, 50V, J
C212	22342103	Ceramic, 0.01mfd, 50V, Z
C213	22442331	Electrolytic, 330mfd, 6.3V
C214	22442331	Electrolytic, 330mfd, 6.3V
C215	22342223	Ceramic, 0.022mfd, 50V, Z
C216	22443102	Electrolytic, 1000mfd, 10V
C217	22442471	Electrolytic, 470mfd, 6.3V
C218	22448339	Electrolytic, 3.3mfd, 50V
C219	22362680	Ceramic, 68pF, 50V, K
C220	22349121	Ceramic, 120pF, 50V, K
C221	22349121	Ceramic, 120pF, 50V, K
C222	22442331	Electrolytic, 330mfd, 6.3V
C223	22448229	Electrolytic, 2.2mfd, 50V
C224	22342223	Ceramic, 0.022mfd, 50V, Z
C226	22342223	Ceramic, 0.022mfd, 50V, Z
C227	22443331	Electrolytic, 330mfd, 10V
C228	22371224	Mylar, 0.22mfd, 50V, J
C230	22442471	Electrolytic, 470mfd, 6.3V
C231	22448229	Electrolytic, 2.2mfd, 50V
RESISTORS **All resistors are carbon film ¼W, ±5%, unless otherwise noted. K = 1000, M = 1000000**		
TUNER AND POWER SUPPLY		
R001	22555101	100 ohm
R102	22555101	100 ohm
R103	22555101	100 ohm
R104	22545223	22K ohm
R105	22555332	3.3K ohm
R106	22555102	1K ohm
R107	22555331	330 ohm
R108	22555154	150K ohm
R109	22555560	56 ohm
R110	22555331	330 ohm
R111	22555332	3.3K ohm
R112	22555562	5.6K ohm
R113	22555223	22K ohm
R114	22555563	56K ohm
R115	22555333	33K ohm
R116	22555473	47K ohm
R117	22555333	33K ohm
R118	22555333	33K ohm
R119	22555333	33K ohm
R120	22555103	10K ohm
R121	22555102	1K ohm
R122	22555683	68K ohm
R123	22555473	47K ohm
R124	22555123	12K ohm
R125	22555333	33K ohm
R126	22555154	150K ohm
R127	22555103	10K ohm
R128	22555224	220K ohm
R129	22555563	56K ohm
R130	22555103	10K ohm
R131	22555103	10K ohm
R132	22555273	27K ohm
R133	22555102	1K ohm
R134	22555562	5.6K ohm
R135	22555683	68K ohm
R136	22555124	120K ohm
R137	22555223	22K ohm
R138	22555562	5.6K ohm
R139	22555222	2.2K ohm
R140	22555823	82K ohm
R141	22555122	1.2K ohm
R142	22555333	33K ohm
R143	22555271	270 ohm
R144	22555152	1.5K ohm
R145	22555152	1.5K ohm
R201	22555101	100 ohm
R202	22555102	1K ohm
R205	22555332	3.3K ohm
R206	22555332	3.3K ohm
R207	22555683	68K ohm
R208	22658499	1M ohm, B, Semi-fixed Variable
R209	22555562	5.6K ohm
R210	22555153	15K ohm
R211	22555821	820 ohm
R212	22555682	6.8K ohm
R213	22555153	15K ohm
R214	22658494	50K ohm, B, Semi-fixed Variable
R215	22555562	5.6K ohm
R216	22555153	15K ohm
R217	22555821	820 ohm
R218	22555153	15K ohm
R219	22555682	6.8K ohm
R220	22555682	6.8K ohm
R221	22555123	12K ohm
R222	22555473	47K ohm
R223	22555153	15K ohm
R224	22658498	10K ohm, B, Semi-fixed Variable

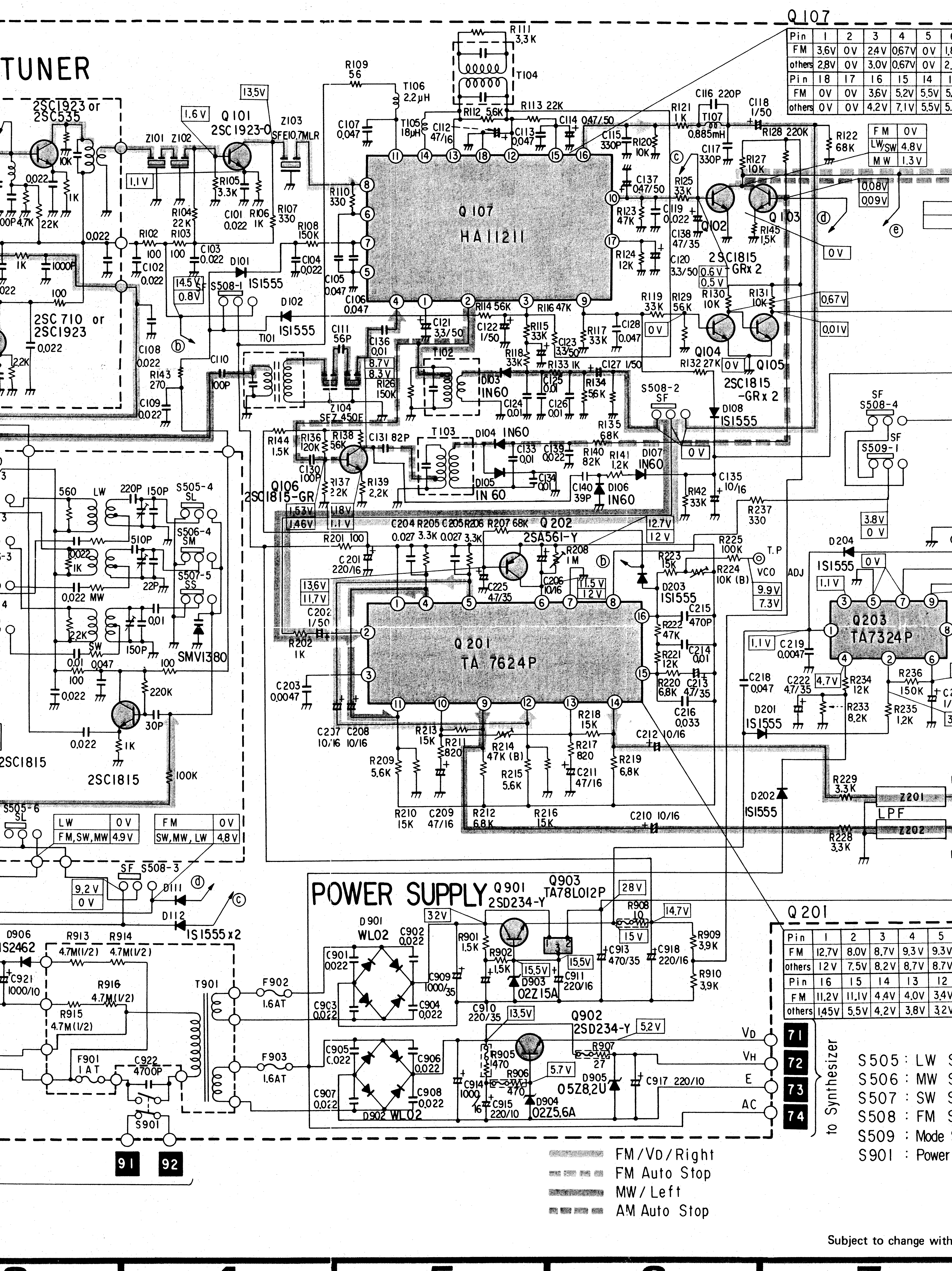
Symbol No.	Part No.	Description
R225	22555104	100K ohm
R226	22555682	6.8K ohm
R227	22555682	6.8K ohm
R228	22555332	3.3K ohm
R229	22555332	3.3K ohm
R230	22555332	3.3K ohm
R231	22555332	3.3K ohm
R233	22555822	8.2K ohm
R234	22555123	12K ohm
R235	22555122	1.2K ohm
R236	22555154	150K ohm
R237	22555331	330 ohm
R901	22555152	1.5K ohm
R902	22555152	1.5K ohm
R905	22500114	470 ohm, Fusible
R906	22500114	470 ohm, Fusible
R907	22500118	27 ohm, Fusible
R908	22500130	10 ohm, Fusible
R909	22555392	3.9K ohm
R910	22555392	3.9K ohm
R911	22555682	6.8K ohm
R912	22555682	6.8K ohm
R913	22563475	4.7M ohm, ½W
R914	22563475	4.7M ohm, ½W
R915	22563475	4.7M ohm, ½W
R916	22563475	4.7M ohm, ½W
DISPLAY AND SYNTHESIZER SECTION		
R101	22545101	100 ohm
R102	22545101	100 ohm
R103	22545101	100 ohm
R104	22545101	100 ohm
R105	22545101	100 ohm
R106	22545101	100 ohm
R107	22545101	100 ohm
R108	22545101	100 ohm
R109	22545101	100 ohm
R110	22545101	100 ohm
R111	22545101	100 ohm
R112	22545101	100 ohm
R113	22545101	100 ohm
R114	22545101	100 ohm
R115	22545473	47K ohm
R116	22545473	47K ohm
R117	22545473	47K ohm
R118	22545473	47K ohm
R119	22545221	220 ohm
R120	22545221	220 ohm
R121	22545221	220 ohm
R122	22545221	220 ohm
R123	22545221	220 ohm
R201	22555102	1K ohm
R202	22555103	10K ohm

Symbol No.	Part No.	Description
R203	22555123	12K ohm
R204	22555102	1K ohm
R205	22555564	560K ohm
R206	22555102	1K ohm
R207	22555562	5.6K ohm
R208	22555103	10K ohm
R209	22555103	10K ohm
R210	22555103	10K ohm
R211	22555154	150K ohm
R212	22555473	47K ohm
R213	22555103	10K ohm
R214	22555223	22K ohm
R215	22555223	22K ohm
R216	22555103	10K ohm
R217	22555272	2.7K ohm
R218	22555473	47K ohm
R219	22555153	15K ohm
R220	22555103	10K ohm
R221	22555332	3.3K ohm
R222	22555333	33K ohm
R223	22555474	470K ohm
R224	22555104	100K ohm
R225	22555223	22K ohm
R226	22555393	39K ohm
R227	22555473	47K ohm
R228	22555103	10K ohm
R229	22555683	68K ohm
R230	22555470	47 ohm
R231	22555470	47 ohm
R232	22555470	47 ohm
R233	22555470	47 ohm
R234	22555101	100 ohm
R235	22555101	100 ohm
R236	22555101	100 ohm
R237	22555101	100 ohm
R238	22555333	33K ohm
R240	22555564	560K ohm
R241	22555472	4.7K ohm
R242	22555104	100K ohm
C = Common, I = Individual		
RR201	22540267	4.7K ohm x 9 Network, C
RR202	22540270	10K ohm x 7 Network, I
RR203	22540270	10K ohm x 7 Network, I
RR204	22540268	33K ohm x 12 Network, C
RR205	22540385	15K ohm x 8 Network, C
RR206	22540263	100K ohm x 4 Network, C
RR207	22540266	10K ohm x 7 Network, C
RR208	22540263	100K ohm x 4 Network, C
RR209	22540270	10K ohm x 7 Network, C
RR210	22540264	22K ohm x 10 Network, C

Symbol No.	Part No.	Description
CABINET PARTS		
301	22821468	Panel Ass'y
302	22712392	Cover, Top
303	22712395	Side Plate
304	22712394	Jack Plate (TE)
	22712414	Jack Plate (TU)
306	22712391	Back Plate
307	22835094	Knob, Key Push
308	22848302	Dial Plate
309	25764565	Nylon Washer
310	25772519	Spring, Key Switch
311	22828070	Foot
312	22824313	Knob, Lever Power
313	22835095	Knob, Push
314	25772524	Spring, Push Knob
319	22755254	Joint
322	22758159	Spacer, LED (D106 ~ 114)
323	22758160	Spacer, LED (D117 ~ 121)
324	22758161	Spacer, LED (D103, 122)
325	22758162	Spacer, LED (D115, 116)
326	22758163	Spacer, LED (D104, 105)
327	25845528	Nylon Bush
328	22705020	Rivet, Plastic, 3ϕ x 4.5mm
329	22705022	Rivet, Plastic, 3ϕ x 5.5mm
330	22707009	Screw, 4ϕ x 8mm (BLK)
331	22707419	Screw, PAN Tapping, 3ϕ x 50mm
332	22701436	Screw, PAN, 3ϕ x 8mm
333	22701326	Screw, Tapping, 3ϕ x 8mm
334	22701325	Screw, BID, 3ϕ x 8mm
ACCESSORIES		
	22124452	Aerial, Feeder
	22170109	Cord, Connection
	22902334	Owner's Manual

TUNER & POWER SUPPLY SCHEMATIC DIAGRAM


1
2
3
4
A
B
C
D
E
F
TUNER
FM FRONT END
J001
FM 300Ω
FM 75Ω
E
EXT AM ANT
100P
0.022
3SK59 or 3SK45
ISV55
ISV55ⓐ
2SC1923 or 2SC535
1SV55
100K
0.022
100
5P
18P
2P
10K
1K
1000P
4.7K
22K
FM OSC
77
R001 100
1000P
330
4P
0.5P
8.2K
2SK61
2SC710 or 2SC1923
6P
15P
2.2K
3P
AM OSC
78
C001 150P
to Synthesizer
13.5V
1.6V
Q101 2SC1923-O
Z101
Z102
1.1V
R105 3.3K
R104 22K
R103
C101 0.022
R106 1K
R102 100
C102 0.022
C103 0.022
D101
1S1555
14.5V
0.8V
SF
S508-1
ⓑ
T101
C108 0.022
R143 270
C110 100P
C109 0.022
AM 3BAND TUNER
Bar Ant
S507-2 SS
S505-1 SL
S506-1 SM
S507-1 SS
S505-2 SL
S506-2 SM
LW
MW
SW
0.01
68P
100P
33P
SMV1380
S505-3 SL
S507-3 SS
S506-3 SM
S507-4 SS
S505-4 SL
S506-4 SM
S507-5 SS
2SC1815
15K
3.9K
560
220P
150P
510P
22P
0.022 MW
0.047
220K
30P
47K
2SC941
1.5K
100K
S507-6 SS
S506-5 SM
S505-6 SL
SW | 0V
FM, MW, LW | 4.9V
LW | 0V
FM, SW, MW | 4.9V
FM | 0V
SW, MW, LW | 4.8V
D109
D110
1S1555x2
ⓔ
SF S508-3
9.2V
0V
D111
ⓓ
D112
ⓒ
R911 6.8K
R912 6.8K
C920 0.022
C919 0.022
D908 1S1555
D906 1S2462
D907 02Z8.2A
C921 1000/10
R913 4.7M(1/2)
R914 4.7M(1/2)
R916 4.7M(1/2)
R915 4.7M(1/2)
T901
F901 1AT
C922 4700P
S901
AC 220/240V 50 Hz
1.6A
VD
FM | 2.8V~22.2V
SW | 12V~20.3V
MW | 1V~22.2V
LW | 1.5V~18V
VD
LW
MW
SW
FM
AM/FM
BACK UP +B
79
54
53
52
51
55
75
91
92
to Synthesizer


TUNER
POWER SUPPLY
Q107 HA11211
Q101 2SC1923-O
Q102
Q103
2SC1815 GRx2
Q104
Q105
2SC1815 -GRx2
Q106 2SC1815-GR
Q201 TA 7624P
Q202 2SA561-Y
Q203 TA7324P
Q901 2SD234-Y
Q902 2SD234-Y
Q903 TA78L012P
2SC1923 or 2SC535
2SC710 or 2SC1923
2SC1815
SMV1380
Z101
Z102
Z103 SFE10.7MLR
Z104 SFZ 450F
Z201
Z202
LPF
T101
T102
T103
T104
T105 18μH
T106 2.2μH
T107 0.885mH
T901
D901 WL02
D902 WL02
D903 02Z15A
D904 02Z5.6A
D905 05Z8.2U
D906 IS2462
D111
D112 IS1555x2
F901 1AT
F902 1.6AT
F903 1.6AT
S901
S505-4 SL
S506-4 SM
S507-5 SS
S505-6 SL
S508-1
S508-2 SF
S508-3 SF
S508-4 SF
S509-1 SF
T.P
VCO
ADJ
VD
VH
E
AC
71
72
73
74
to Synthesizer
91
92

Q107

Pin	1	2	3	4	5
FM	3.6V	0V	2.4V	0.67V	0V
others	2.8V	0V	3.0V	0.67V	0V
Pin	18	17	16	15	14
FM	0V	0V	3.6V	5.2V	5.5V
others	0V	0V	4.2V	7.1V	5.5V

FM	0V
LW/SW	4.8V
MW	1.3V

LW	0V
FM,SW,MW	4.9V

FM	0V
SW,MW, LW	4.8V

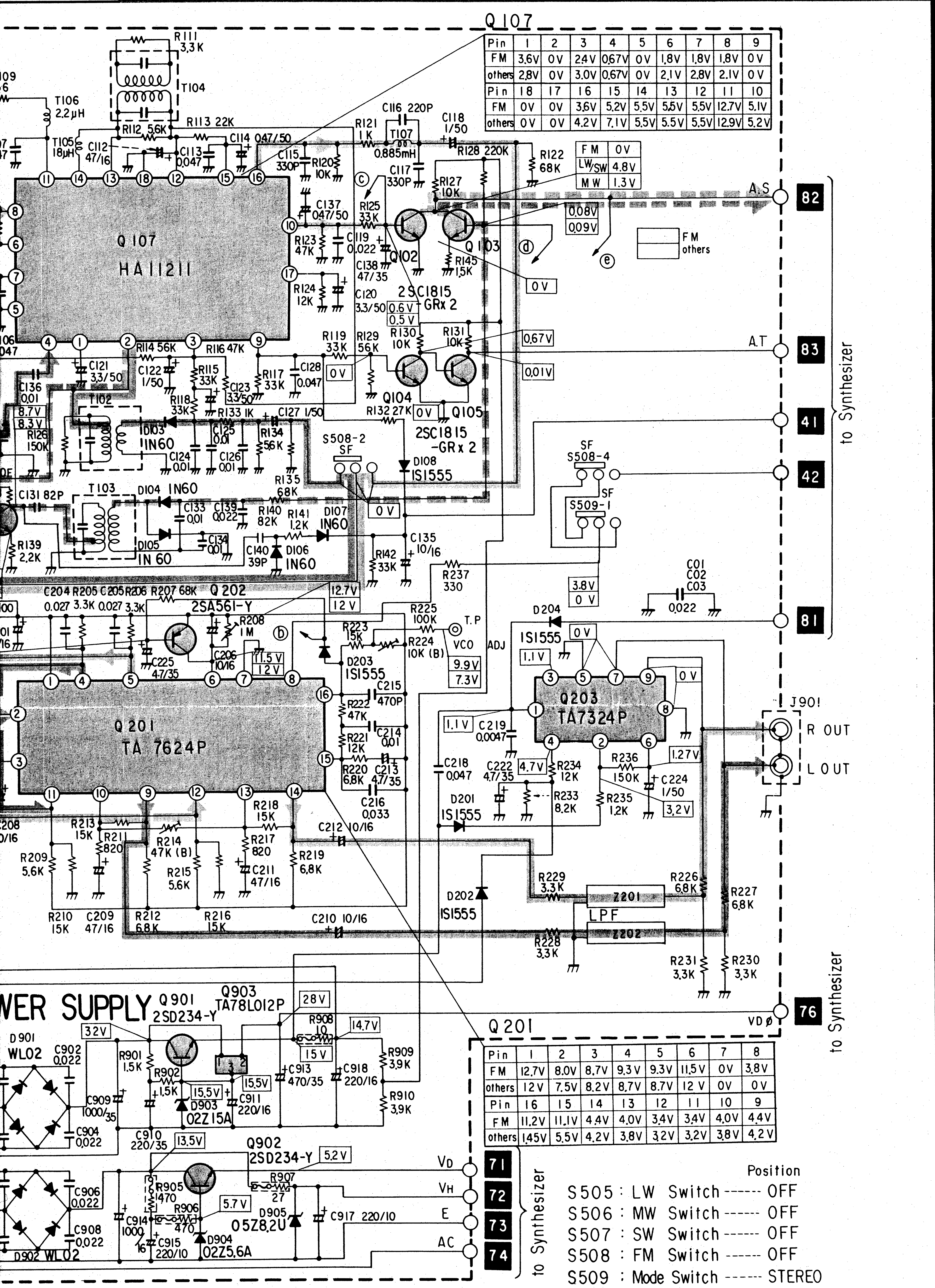
Q201

Pin	1	2	3	4	5
FM	12.7V	8.0V	8.7V	9.3V	9.3V
others	12V	7.5V	8.2V	8.7V	8.7V
Pin	16	15	14	13	12
FM	11.2V	11.1V	4.4V	4.0V	3.4V
others	1.45V	5.5V	4.2V	3.8V	3.2V

S505 : LW
S506 : MW
S507 : SW
S508 : FM
S509 : Mode
S901 : Power

▨ FM/VD/Right
▨ FM Auto Stop
▨ MW/Left
▨ AM Auto Stop

Subject to change with


Q107 HA11211
Q102 Q103 2SC1815 GRx2
Q104 Q105 2SC1815 -GRx2
Q202 2SA561-Y
Q201 TA7624P
Q203 TA7324P
T104 T106 2.2μH T105 18μH T107 0.885mH T102 T103
R111 3.3K R112 56K R113 22K C114 0.47/50 C116 220P C118 1/50 R128 220K R122 68K
A.S 82
A.T 83
41
42
81
to Synthesizer
S508-2 SF S508-4 SF S509-1 SF
D108 1S1555 D103 1N60 D104 1N60 D105 1N60 D106 1N60 D107 1N60
T.P VCO ADJ R224 10K (B) 9.9V 7.3V
D204 1S1555 D201 1S1555 D202 1S1555 D203 1S1555
J901 R OUT L OUT
Z201 LPF Z202
VD ø 76
to Synthesizer
POWER SUPPLY
Q901 2SD234-Y Q903 TA78L012P Q902 2SD234-Y
D901 WL02 D902 WL02 D903 02Z15A D904 02Z5.6A D905 05Z8.2U
Vd 71 Vh 72 E 73 AC 74
to Synthesizer
FM others

Q107

Pin	1	2	3	4	5	6	7	8	9
FM	3.6V	0V	2.4V	0.67V	0V	1.8V	1.8V	1.8V	0V
others	2.8V	0V	3.0V	0.67V	0V	2.1V	2.8V	2.1V	0V
Pin	18	17	16	15	14	13	12	11	10
FM	0V	0V	3.6V	5.2V	5.5V	5.5V	5.5V	12.7V	5.1V
others	0V	0V	4.2V	7.1V	5.5V	5.5V	5.5V	12.9V	5.2V

FM	0V
LW/SW	4.8V
MW	1.3V

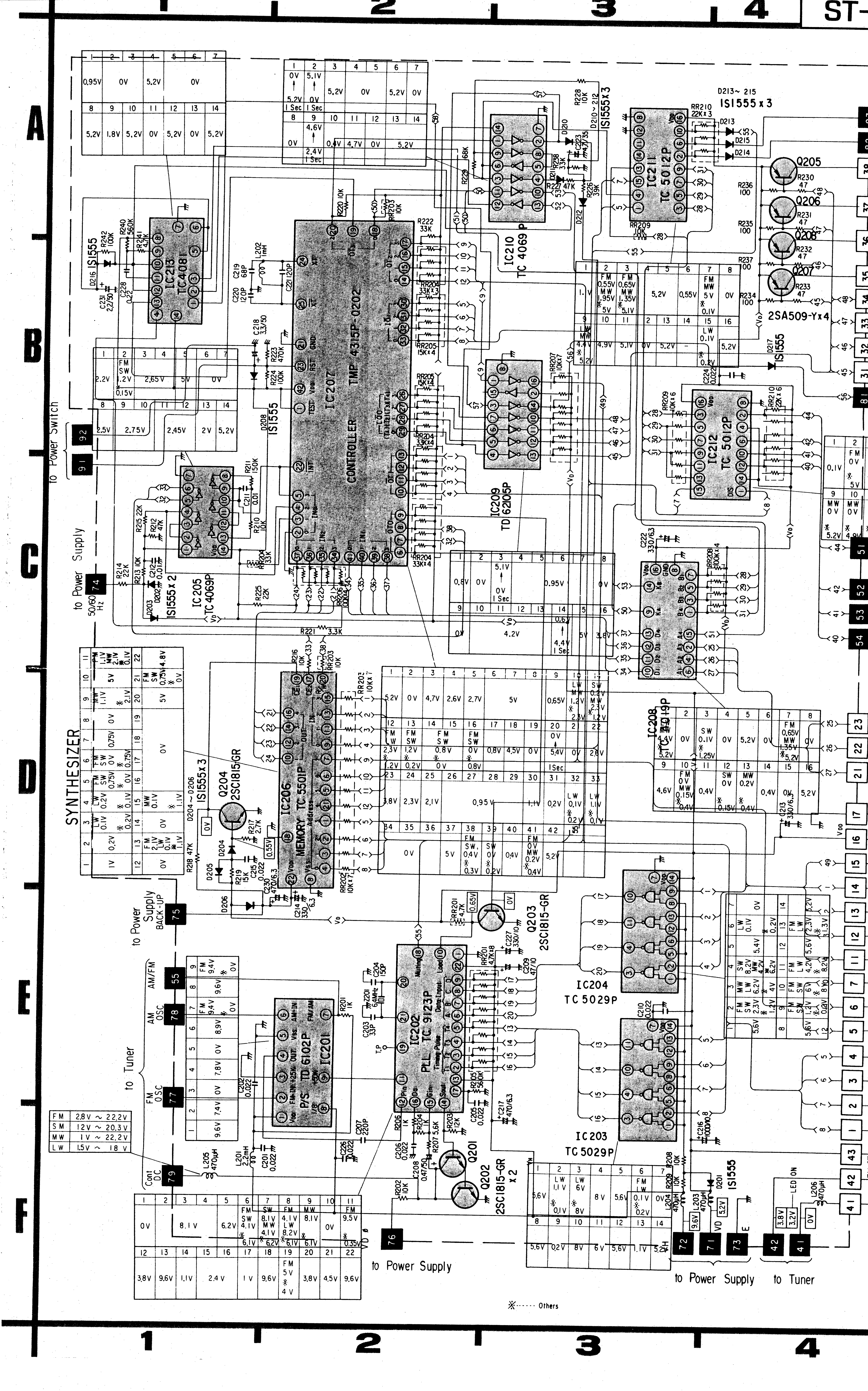
Q201

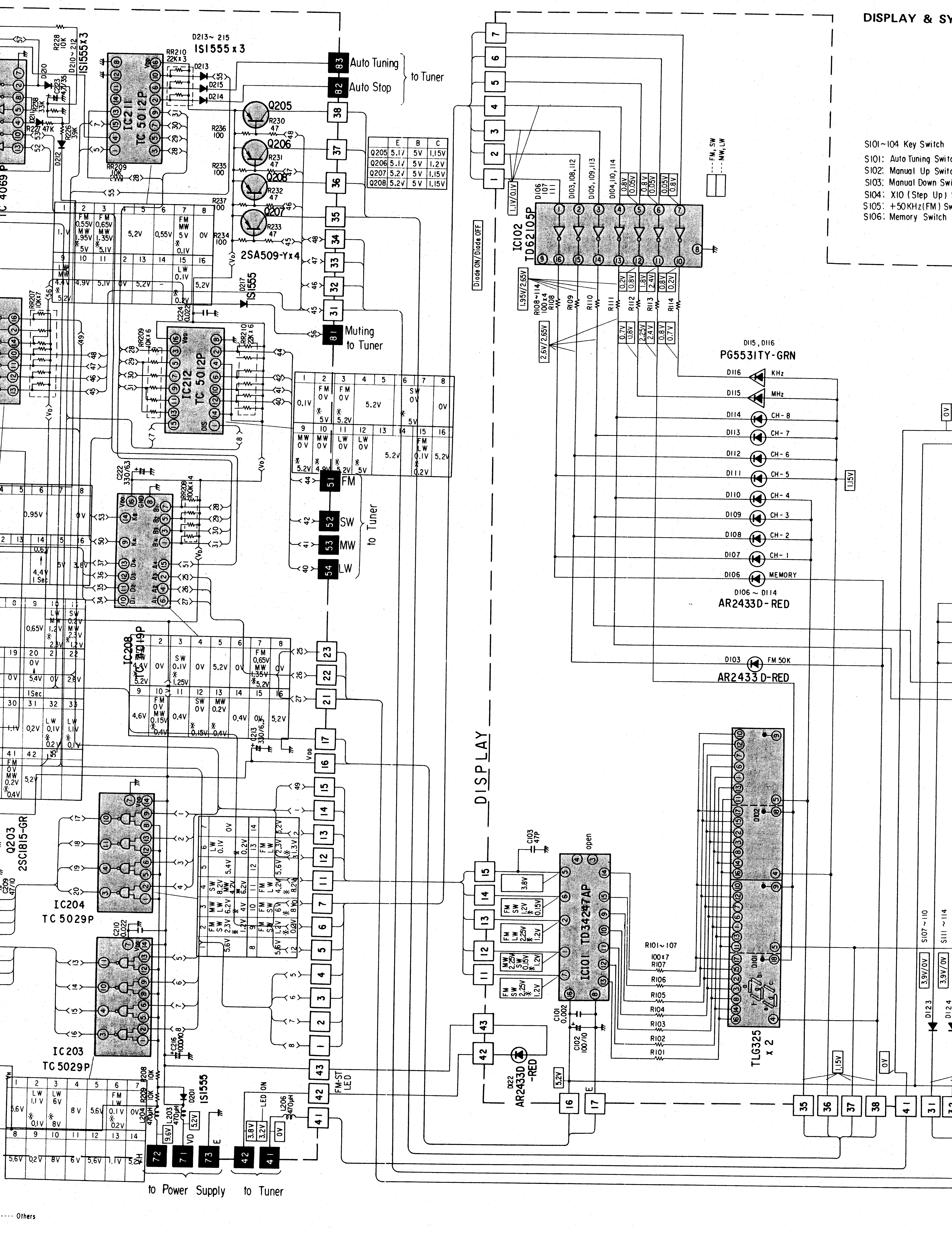
Pin	1	2	3	4	5	6	7	8
FM	12.7V	8.0V	8.7V	9.3V	9.3V	11.5V	0V	3.8V
others	12V	7.5V	8.2V	8.7V	8.7V	12V	0V	0V
Pin	16	15	14	13	12	11	10	9
FM	11.2V	11.1V	4.4V	4.0V	3.4V	3.4V	4.0V	4.4V
others	1.45V	5.5V	4.2V	3.8V	3.2V	3.2V	3.8V	4.2V

	Position
S505 : LW Switch	OFF
S506 : MW Switch	OFF
S507 : SW Switch	OFF
S508 : FM Switch	OFF
S509 : Mode Switch	STEREO
S901 : Power Switch	OFF

▨	FM/Vd/Right
▨ ▨ ▨	FM Auto Stop
▨	MW/Left
▨ ▨ ▨	AM Auto Stop

Subject to change without notice.


SYNTHESIZER
IC207 TMP 4315P-0202 CONTROLLER
IC206 TC 5501P MEMORY
IC202 TC 9123P PLL
IC201 TD 6102P P/S
IC205 TC 4069P
IC209 TD 62105P
IC210 TC 4069P
IC211 TC 5012P
IC212 TC 5012P
IC213 TC 4081
IC208 TC 5019P
IC204 TC 5029P
IC203 TC 5029P
Q204 2SC1815-GR
Q203 2SC1815-GR
Q201 Q202 2SC1815-GR x 2
Q205 Q206 Q207 Q208 2SA509-Y x 4
D204~D206 1S1555 x 3
D210~212 1S1555 x 3
D213~215 1S1555 x 3
D202 D203 1S1555 x 2
D208 1S1555
D216 1S1555
D217 1S1555
D201 1S1555
to Power Switch
to Power Supply 50/60 Hz
to Power Supply BACK-UP
to Tuner
AM/FM
AM OSC
FM OSC
Cont DC
to Power Supply
to Tuner
FM 2.8V ~ 22.2V
SM 12V ~ 20.3V
MW 1V ~ 22.2V
LW 1.5V ~ 18V
※------ Others


DISPLAY & SY
S101~104 Key Switch
S101: Auto Tuning Switc
S102: Manual Up Switc
S103: Manual Down Swi
S104: X10 (Step Up)
S105: +50KHz(FM) Sw
S106: Memory Switch
D213~215 1S1555x3
D210~212 1S1555X3
IC211 TC5012P
IC212 TC5012P
IC208 TC5019P
IC204 TC5029P
IC203 TC5029P
IC 4069 P
Q205
Q206
Q208
Q207
2SA509-Yx4
Q203 2SC1815-GR
D217 1S1555
D201 1S1555
Auto Tuning
Auto Stop
to Tuner
Muting to Tuner
FM
SW
MW
LW
to Tuner
to Power Supply
to Tuner
FM-ST LED
LED ON
E B C
Q205 5.1/ 5V 1.15V
Q206 5.1/ 5V 1.2V
Q207 5.2V 5V 1.15V
Q208 5.2V 5V 1.15V
IC102 TD62105P
Diode ON/Diode OFF
R108~114 100x4
D115, D116 PG5531TY-GRN
D116 KHz
D115 MHz
D114 CH-8
D113 CH-7
D112 CH-6
D111 CH-5
D110 CH-4
D109 CH-3
D108 CH-2
D107 CH-1
D106 MEMORY
D106~D114 AR2433D-RED
D103 FM 50K
AR2433 D-RED
DISPLAY
IC101 TD34247AP
R101~107 100x7
TLG325 x 2
D122 AR2433D -RED
FM, SW
MW, LW
S107~110
S111~114
D123
D124
---- Others

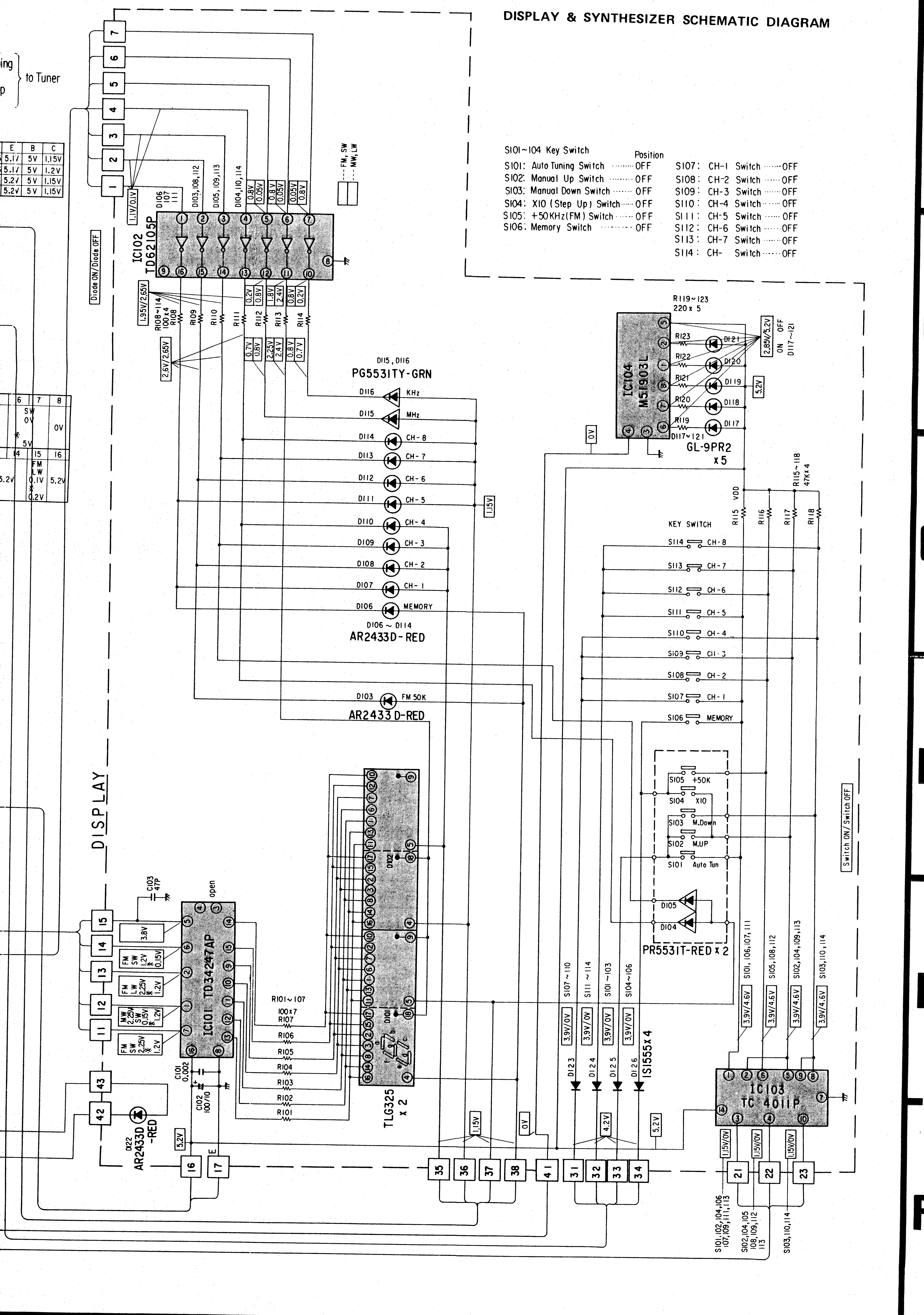
DISPLAY & SYNTHESIZER SCHEMATIC DIAGRAM

S101~104 Key Switch

Position

S101: Auto Tuning Switch ········ OFF
S102: Manual Up Switch ········ OFF
S103: Manual Down Switch ······· OFF
S104: X10 (Step Up) Switch ····· OFF
S105: +50KHz(FM) Switch ····· OFF
S106: Memory Switch ········ OFF

S107: CH-1 Switch ······ OFF
S108: CH-2 Switch ······ OFF
S109: CH-3 Switch ······ OFF
S110: CH-4 Switch ······ OFF
S111: CH-5 Switch ······ OFF
S112: CH-6 Switch ······ OFF
S113: CH-7 Switch ······ OFF
S114: CH- Switch ······ OFF


to Tuner
IC102 TD62105P
Diode ON/Diode OFF
D106 107 111
D103,108,112
D105,109,113
D104,110,114
R108~114 100 x 4
1.95V/2.65V
2.6V/2.65V
1.1V/0.1V
FM, SW
MW, LW
D115, D116
PG5531TY-GRN
D116 KHz
D115 MHz
D114 CH-8
D113 CH-7
D112 CH-6
D111 CH-5
D110 CH-4
D109 CH-3
D108 CH-2
D107 CH-1
D106 MEMORY
D106 ~ D114
AR2433D-RED
D103 FM 50K
AR2433 D-RED
R119~123
220 x 5
IC104 M51903L
D117~121
GL-9PR2 x5
2.85V/5.2V
ON OFF
R115~118 47K x 4
VDD
KEY SWITCH
S114 CH-8
S113 CH-7
S112 CH-6
S111 CH-5
S110 CH-4
S109 CH-3
S108 CH-2
S107 CH-1
S106 MEMORY
S105 +50K
S104 X10
S103 M.Down
S102 M.UP
S101 Auto Tun
D105
D104
PR5531T-RED x 2
Switch ON/Switch OFF
DISPLAY
C103 47P
open
IC101 TD34247AP
R101~107 100 x 7
TLG325 x 2
C101 0.002
C102 100/10
D122 AR2433D -RED
D123 D124 D125 D126 1S1555x4
S107~110
S111~114
S101~103
S104~106
S101,106,107,111
S105,108,112
S102,104,109,113
S103,110,114
IC103 TC4011P
S101,102,104,106 107,109,111,113
S102,104,105 108,109,112 113
S103,110,114
3.9V/0V
3.9V/4.6V
1.15V/0V
1.15V
4.2V
5.2V
0V
A
B
C
D
E
F
5
6
7
8